**ENVIRONMENTAL
RESTORATION
PROGRAM**

**Site Descriptions of
Environmental Restoration Units
at the Oak Ridge K-25 Site,
Oak Ridge, Tennessee**

MANAGED BY
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

UCR-17500 (6-8-95)

ENERGY SYSTEMS

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Environmental Restoration Division
K-25 Environmental Restoration Program

**SITE DESCRIPTIONS OF ENVIRONMENTAL
RESTORATION UNITS AT THE OAK RIDGE
K-25 SITE, OAK RIDGE, TENNESSEE**

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Date Issued: November 1995

Prepared by the
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CONTENTS

ACRONYMS	ix
PREFACE	xi
EXECUTIVE SUMMARY	xiii
INTRODUCTION	1-1
RCRA COMPLIANCE AND THE HSWA PERMIT	1-1
CERCLA COMPLIANCE AND THE FFA	1-2
WASTE AREA GROUPINGS AND OPERABLE UNITS	1-2
DECONTAMINATION AND DECOMMISSIONING SITES	1-2
Blair Road Asphalt Plant	2-1
Building 523 Grease Storage	3-1
Building 526 Heavy Equipment Shop	4-1
Building 569 Heavy Equipment Shop	5-1
Building 664 Heavy Equipment Shop	6-1
Building 665 Steam Shed	7-1
Building F-29 Gasoline Station	8-1
Demolition Materials Placement Area	9-1
Duct Island Road	10-1
F-05 Laboratory	11-1
F-07 Material Warehouse	12-1
F-08 Laboratory	13-1
Flannagan's Loop Road	14-1
J. A. Jones Cleaning Area	15-1
J. A. Jones Disposal Area	16-1
J. A. Jones Maintenance Complex	17-1
K-25 Process Building	18-1
K-25 Site Contractor's Spoil Area	19-1
K-25 Site North Trash Slope	20-1
K-25/K-27 Tielines, Outdoor Process	21-1
K-27 Process Building	22-1
K-27 Tielines, Outdoor Process	23-1

K-27/29 Recirculating Cooling Water Lines	24-1
K-29 Process Building	25-1
K-31 Process Building	26-1
K-31 Recirculating Cooling Water Lines	27-1
K-31/K-631 Tielines, Outdoor Process	28-1
K-33 Process Building	29-1
K-33 Recirculating Cooling Water Lines	30-1
K-33/K-31 Tielines, Outdoor Process	31-1
K-101 Compressor Laboratory	32-1
K-131 Maintenance Shop	33-1
K-300 Area Service Station	34-1
K-300-C Coolant Storage Area	35-1
K-413 Product Withdrawal Facility	36-1
K-631 Contaminated Soil	37-1
K-631 Process Tails	38-1
K-633 Test Loop Facility	39-1
K-701 Boiler House–Fabrication Shop	40-1
K-702 Turbine Room and Discharge	41-1
K-703 Fabrication Shop and Biophysical Laboratory	42-1
K-705-B Crib House	43-1
K-706 Pump House	44-1
K-707 Auxiliary Switch House	45-1
K-709 Switchyard	46-1
K-710 Sludge Beds and Imhoff Tanks	47-1
K-712 Fairchild Switch House Substation	48-1
K-715 Water Valve House	49-1
K-720 Fly Ash Pile	50-1
K-722 Area Landfarming	51-1
K-724 Storage Warehouse	52-1
K-725 Beryllium Building	53-1
K-726 PCB Storage Facility	54-1
K-731 Switch House & K-732 Switchyard	55-1
K-734 Storage/Breaker House	56-1
K-735 Storage Building	57-1
K-736 Storage Building	58-1
K-738 Chlorinator House	59-1

K-762 Switchyard and K-761 Switch House	60-1
K-766 CRBR Sampling Storage Shed	61-1
K-770 Scrap Metal Yard and Contaminated Debris	62-1
K-792 Switchyard/K-791 Switch Houses	63-1
K-797 Electrical Switchgear Room	64-1
K-798 Switchgear Room	65-1
K-801 Intake Water Pumphouse	66-1
K-801-A Water Treatment Facility	67-1
K-801-B Clariflow Tank	68-1
K-801-H Cooling Tower and Basin	69-1
K-802 Gasoline Storage Tank	70-1
K-802-H Cooling Tower Basin	71-1
K-822 Cooling Tower Basin	72-1
K-832 Recirculating Water Pumphouse	73-1
K-832-H Cooling Tower and Basin	74-1
K-833 Cooling Water Return Pumphouse	75-1
K-834 Valve House	76-1
K-861 Cooling Towers and Basins	77-1
K-862 RCW Pumphouse	78-1
K-891 Raw Water Pumphouse	79-1
K-892 Pumphouse Area	80-1
K-892-G Cooling Tower and Basin	81-1
K-892-H Cooling Tower and Basin	82-1
K-892-J Cooling Tower and Basin	83-1
K-895 Cylinder Destruct Facility	84-1
K-901-A Holding Pond	85-1
K-901-A North Waste Disposal Area	86-1
K-901 South Waste Disposal Area	87-1
K-1004 Area Lab Drain	88-1
K-1004-J Special Development Lab	89-1
K-1004-J Underground Tank	90-1
K-1004-J Vaults	91-1
K-1004-L Pilot Plant	92-1
K-1004-L RCW Lines/K-1004-N Cooling Towers	93-1
K-1004-Q Centrifuge Laboratory	94-1
K-1007 Gas Tank	95-1

K-1007-P1 Holding Pond	96-1
K-1010 Laboratory, Receiving and Handling	97-1
K-1023 Laboratory	98-1
K-1024 Buildings	99-1
K-1024 Dilution Pit	100-1
K-1025-E Warehouse	101-1
K-1027 Service Station	102-1
K-1031 Storage Building	103-1
K-1035 Acid Pits	104-1
K-1035 Gasoline Station	105-1
K-1037 Industrial Research Facility	106-1
K-1037 Recirculating Cooling Water Lines	107-1
K-1044 Heavy Equipment Repair Shop	108-1
K-1045 Valve Shop	109-1
K-1045-A Waste Oil Burning Pit	110-1
K-1047 Motor Pool Repair Shop	111-1
K-1048 Tire and Battery Shop	112-1
K-1050 Wash, Grease and Paint Shop	113-1
K-1052 Advanced Machine Development Lab	114-1
K-1055 Gasoline/Diesel Station	115-1
K-1064 Drum Storage and Burn Area	116-1
K-1064-G Drum Deheading Facility	117-1
K-1066-B Cylinder Storage Yard	118-1
K-1066-E Cylinder Storage Yard	119-1
K-1066-J Cylinder Storage Yard	120-1
K-1066-K Cylinder Storage Yard	121-1
K-1070-A Landfarm	122-1
K-1070-A Old Contaminated Burial Ground	123-1
K-1070-B Old Classified Burial Ground	124-1
K-1070-C/D Classified Burial Ground	125-1
K-1070-D1, D2, and D3 Storage Dikes	126-1
K-1070-F Construction Spoil Area	127-1
K-1070-G Burial Ground	128-1
K-1085 Old Firehouse Burn Area	129-1
K-1092 Tank Foundation	130-1
K-1098-C Asphalt Plant	131-1

K-1099 Blair Quarry	132-1
K-1131 Feed and Tails Facility	133-1
K-1131 Neutralization Pile	134-1
K-1132 HF Storage	135-1
K-1200-SB Centrifuge, South Bay	136-1
K-1206-E Sandblasting Residue	137-1
K-1210 Centrifuge Test Facility	138-1
K-1210 RCW Lines and Cooling Towers	139-1
K-1210-A Advanced Equipment Test Facility	140-1
K-1217 Metallizing Shop	141-1
K-1218 Coded Chemicals Storage Facility	142-1
K-1220 Centrifuge Plant Demonstration Facility	143-1
K-1231 Process Building	144-1
K-1232 Chemical Recovery Facility & Lagoon	145-1
K-1233 Collection Facility	146-1
K-1236 Paint Shop	147-1
K-1300 Brick Stack	148-1
K-1301 Fluorine Production Facility	149-1
K-1302 Fluorine Storage Building	150-1
K-1303 Fluorine Facility	151-1
K-1303 Mercury Distillation and Recovery Unit	152-1
K-1401 Acid Line	153-1
K-1401 Degreasers	154-1
K-1401-N Converter Re-Tubing Area	155-1
K-1401-NB Basement Area	156-1
K-1407 Contaminated Debris	157-1
K-1407-B Holding Pond	158-1
K-1407-C Retention Basin	159-1
K-1407-C/K-1417 Soils	160-1
K-1410 Neutralization Pit	161-1
K-1410 Plating Facility	162-1
K-1413 Laboratory Engineering	163-1
K-1413 Treatment Tanks and Process Lines	164-1
K-1414 Garage Diesel Tank	165-1
K-1417 Block Casting/Storage Area	166-1
K-1419 Sludge Fixation Plant	167-1

K-1420 Contaminated Drum Storage	168-1
K-1420 Decontamination and Uranium Recovery	169-1
K-1420 Mercury Recovery Room	170-1
K-1420 Oil Decontamination and Recovery Facility	171-1
K-1420 Oil Storage	172-1
K-1420 Process Lines	173-1
K-1420-B Flammable Liquid Storage	174-1
K-1420-C Gas Cylinder Storage	175-1
K-1420-D Valve Sprinkler House	176-1
K-1421 Incinerator	177-1
K-1422 Storage Building	178-1
K-1423 Grease Burial	179-1
K-1501-E Crusher Transfer Building	180-1
K-1503 Neutralization Pit	181-1
K-1600 Technology Test Facility	182-1
K-1700 Stream	183-1
Poplar Creek Disposal Area	184-1
Round House Road	185-1
S-21 Happy Valley Service Station	186-1
SW31 Spring	187-1
T-17 Light Equipment Garage	188-1
T-21 Oil/Grease Station	189-1
T-27/T-5 Pipe Welding Shop	190-1
518 Main Substation	191-1
APPENDIX A. K-25 SITE ENVIRONMENTAL RESTORATION PROGRAM	
UNIT AREA BREAKDOWNS	A-1
APPENDIX B. ER REMOTE SENSING AND SPECIAL SURVEYS PROGRAM	B-1

ACRONYMS

AVLIS	atomic vapor laser isotope separation
BNA	base neural extractables
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIP/CUP	Cascade Improvement Program/Cascade Upgrade Program
CNF	Central Neutralization Facility
D&D/RA	Decontamination and Decommissioning/Remedial Actions
DOE-OR	DOE Field Office, Oak Ridge
EP	Extraction Procedure
EPA	U.S. Environmental Protection Agency
ETF	Equipment Test Facility
FFA	Federal Facilities Agreement
HEPA	high-efficiency particulate air
HSWA	Hazardous and Solid Waste Amendments
MAN	Molecular Anatomy Project
MFL	Miller's Fluorinated Lubricating (oil)
MSDS	material safety data sheet
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
ORDGP	Oak Ridge Gaseous Diffusion Plant (name officially changed to Oak Ridge K-25 Site in October 1990)
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OU	Operable Unit
PA	preliminary assessment
PCB	polychlorinated biphenyl
PWMP	Pond Waste Management Program
QA	quality assurance
QC	quality control
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RCW	recirculating cooling water
RFI	RCRA facility investigation
RI	remedial investigation
SARA	Superfund Amendments and Reauthorization Act
SD	storm drain
SI	site investigation
SWMU	Solid Waste Management Unit
TCLP	toxicity characteristic leaching procedure
TDEC	Tennessee Department of Environmental Conservation
TDHE	Tennessee Department of Health and Environment
TSCA	Toxic Substances Control Act

TSD	treatment, storage, and disposal
UST	underground storage tank
WAG	Waste Area Grouping

PREFACE

This document is the first complete revision of the original Site Descriptions document, published in October 1991. This revision incorporates wide-reaching programmatic and regulatory changes that have redefined what constitutes a K-25 Site Environmental Restoration unit. These changes include the differentiation between RCRA HSWA permit units and CERCLA FFA units, and the inclusion of Decontamination and Decommissioning (D&D) units in the ER program. These changes, as well as the inclusion of numerous units not listed in the earlier version, are incorporated in this update.

Information from this document comes primarily from previously published public and internal reports, including Site Historical Investigations, and from the K-25 Site Access and K-25 Site D&D Facility databases. This document was prepared by the K-25 Environmental Restoration Program under Activity Data Sheet 4501, Program Management, Work Breakdown Structure element number 1.4.12.4.3.01.

The current version of this document is maintained on an Internet World Wide Web server. The address to view this version is as follows: <http://www.ornl.gov/er/k-er-47/homepg.htm>. For further information about this document, contact P.L. Goddard at (423)576-3692, email: goddardpl@ornl.gov.

EXECUTIVE SUMMARY

This report, *Site Descriptions of Environmental Restoration Units at the Oak Ridge K-25 Site, Oak Ridge, Tennessee*, is being prepared to assimilate information on sites included in the Environmental Restoration (ER) Program of the K-25 Site, one of three major installations on the Oak Ridge Reservation (ORR) built during World War II as part of the Manhattan Project. The information included in this report will be used to establish program priorities so that resources allotted to the K-25 ER Program can be best used to decrease any risk to humans or the environment, and to determine the sequence in which any remedial activities should be conducted. This document will be updated periodically in both paper and Internet versions.

Units within this report are described in individual data sheets arranged alphanumerically. Each data sheet includes entries on project status, unit location, dimensions and capacity, dates operated, present function, lifecycle operation, waste characteristics, site status, media of concern, comments, and references. Each data sheet is accompanied by a photograph of the unit, and each unit is located on one of 13 area maps. These areas, along with the sub-area, unit, and sub-unit breakdowns within them, are outlined in Appendix A. Appendix B is a summary of information on remote aerial sensing and its applicability to the ER program.

INTRODUCTION

This report, *Site Descriptions of Environmental Restoration Units at the Oak Ridge K-25 Site, Oak Ridge, Tennessee*, is being prepared to assimilate information on sites included in the Environmental Restoration (ER) Program of the K-25 Site. The Oak Ridge K-25 Site is one of three major installations on the Oak Ridge Reservation (ORR) that were built during World War II as part of the Manhattan Project. The mission of K-25 in the Manhattan Project was to develop processes for producing enriched uranium for the atomic bomb. These processes, once developed, continued producing enriched uranium for commercial nuclear reactors until 1985 when process operations at the K-25 Site were put in standby status; the site was permanently shut down in 1986. A result of the research, development, and production activities that took place at K-25, several types of wastes, including hazardous and radioactive wastes, have been generated. The ER Program has the responsibility for maintaining, decontaminating, decommissioning, and remediating the areas through the K-25 site at which hazardous and/or radioactive waste might exist. The information included in this report will be used to establish program priorities so that resources allotted to the K-25 ER Program can be best used to decrease any risk to humans or the environment, and determine the sequence in which any remedial activities should be conducted.

This is the second revision to descriptions of the sites included in the K-25 ER Program. The previous revision was published in 1991 and had the same title as this document. The first assimilation of this information was included in three separate volumes published in 1987 entitled *3004.u 2.A.1 Assessments for Waste Accumulation Areas for the Oak Ridge Gaseous Diffusion Plant, K/HSD-196*; *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Assessment for the Oak Ridge Gaseous Diffusion Plant, K/HS-168*; and *3004.u 2.A.1 Assessment for the Oak Ridge Gaseous Diffusion Plant, K/HS-167*.

RCRA COMPLIANCE AND THE HSWA PERMIT

Until the passage of the Resources Conservation and Recovery Act (RCRA), as significantly amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984, waste management and disposal activities at the U.S. Department of Energy (DOE) facilities including K-25, were largely unregulated and consequently poorly documented. Additionally, in 1984 it was judicially determined that DOE facilities and waste streams are subject to RCRA, except for wastes that are expressly regulated under the Atomic Energy Act of 1954, (i.e., source, special nuclear, or byproduct material). Also, it was determined that the hazardous waste portion of mixed waste which also contains nuclear materials is subject to RCRA [see *LEAF V. Hodel* 586 F. Supp. 1163 (1984)].

RCRA compliance at the ORR was instituted through the issuance of two permits, one from the State of Tennessee for ORNL Hazardous Waste Storage Facility 7652 (#TN1 890 090 003) and the HSWA permit [TN.001] issued by the Environmental Protection Agency (EPA) under RCRA 3004(u) & (v). These storage permits along with other subsequently issued treatment, storage, or disposal permits require DOE to manage any waste in accordance with the terms and conditions of the permit, as well as governing federal and state regulations.

The HSWA portion of DOE's RCRA permit requires DOE to list and gather information on Solid Waste Management Units (SWMUs) located on the entire ORR, such that EPA can determine whether any investigation or corrective action is required in the event of releases. As a consequence, each of the DOE ORR facilities including K-25 prepared RCRA Facility Assessment Reports and Remedial Investigation Plans which were submitted to EPA by 1988. Two of the 1987 reports were prepared in accordance with this permit requirement; they are *3004.u 2.A.1 Assessments for Waste Accumulation Areas for the Oak Ridge Gaseous Diffusion Plant, K/HSD-196*, and *3004.u 2.A.1 Assessment for the Oak Ridge Gaseous Diffusion Plant, K/HS-167*.

In addition to this submittal, HSWA permit Section II A.1 requires DOE to notify EPA in writing along with specific information upon the discovery of any new or additional SWMUs. Section II.A.8 of the permit requires a submittal of an annual update/revision of the SWMU list for the proceeding calendar year. The information required by Section II.A.1 of the permit for some of the K-25 SWMUs is documented and maintained in this Site Descriptions report.

CERCLA COMPLIANCE AND THE FFA

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 established a regulatory mechanism for providing funding and enforcement authority for inactive hazardous waste sites that had been created in the past in the United States. CERCLA requires that the EPA establish and maintain a list of sites deemed to be "national priorities" for remedial investigation and possible cleanup. The ORR was placed on the National Priorities List (NPL) in November of 1989. Federal facilities cleanup activities are funded by the responsible federal land managing agency and not by the so-called "Superfund."

Shortly after placing the ORR on the NPL, DOE, EPA, and the Tennessee Department of Environment and Conservation entered into a Federal Facility Agreement (FFA), which was signed in January of 1992. This interagency agreement was written to integrate the requirements of RCRA corrective actions and CERCLA remedial investigations at specific sites within the three facilities on the ORR. The specific facilities to which the FFA applies are listed in Appendix C of the FFA, which includes many of the sites on the SWMU list required by the HSWA permit, described in the previous section.

WASTE AREA GROUPINGS AND OPERABLE UNITS

One aspect of RCRA compliance at K-25 was an investigation of groundwater underlying the plant. Over 200 groundwater monitoring wells have been installed throughout the plant to study groundwater flow characteristics and determine flow directions. The information on groundwater flow directions was used to put SWMUs into groups that coincided with groundwater drainage divides. These groups were referred to as Waste Area Groups (WAGs). The groups provided a means of addressing contaminant migration and groundwater contamination in a way that coincided with conditions in the environment. A description of the WAGs designated at K-25 is also included in the document *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program*, DOE/OR-1001/R4.

One aspect of CERCLA is the concept of operable units (OUs). This term refers either to specific media, remedial actions, or geographic groupings of sites undergoing a CERCLA investigation and/or remediation. The latter definition is most commonly used at K-25. A general description of the OUs for K-25 is included in the document *Oak Ridge Reservation Site Management Plan for the Environmental Restoration Program*, DOE/OR-1001/R2, along with many other aspects of the ER Program throughout Oak Ridge.

DECONTAMINATION AND DECOMMISSIONING SITES

Many of the SWMUs at K-25 are associated with structures that were formerly part of the enrichment process operations at K-25. Before 1994, the structures were to be addressed by a separate DOE program that dealt exclusively with structures, the Decontamination and Decommissioning (D&D) Program. Because the contamination in structures and a method of addressing that contamination is included in CERCLA, the D&D structures have been added to Appendix C, and descriptions of them are included in this document.

Unit Name: Blair Road Asphalt Plant

Unit Number: C113

Project Status:

Unit Location: North of the K-25 Site on the south side of Blair Road, north of Ellis Cemetery

Approximate Dimensions and Capacity: Unknown

Dates Operated: 1950s

Present Function: The asphalt plant has been demolished, and the area is currently overgrown with trees and brush. A concrete tank cradle, rusted discharge chute, and a few creosoted timbers still remain at the site.

Life Cycle Operation: Emulsified oil was stored in a large tank and gravity fed to a concrete mixer that had been removed from its truck bed and mounted on a frame. The oil was mixed with limestone chips in the gasoline-engine-driven mixer to produce an asphalt used around process buildings and on some roads for dust suppression. The asphalt produced at the plant was not considered a load-bearing pavement for roads.

Waste Characteristics: Potential hazardous materials used at the site included petroleum oils and leaded gasoline.

In the 1950s ten 5-inch cylinders were found near the asphalt plant. One cylinder was a UF₆ cylinder, with the others being compressed gas containers.

Release Data: Small quantities of oil are known to have been spilled on the ground at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments: This unit was known as the K-1089-C Asphalt Mixing Plant.

References:

K-1089-C Asphalt Mixing Plant: Storage Tank, Drawing No. D-KS-K 5261D, Carbide and Carbon Chemicals Company, Oak Ridge, Tennessee.

K-1089-C Asphalt Mixing Plant: Mixer Platform, Drawing No. D-KS-K 5261E, Carbide and Carbon Chemicals Company, Oak Ridge, Tennessee.

K-1089-C Asphalt Mixing Plant: Conveyor Loading Hopper, Drawing No. D-KS-K 5261F, Carbide and Carbon Chemicals Company, Oak Ridge, Tennessee.

K-1089-C Asphalt Mixing Plant: Conveyor Loading Hopper, Steel Details, Drawing No. D-KS-K 5261G, Carbide and Carbon Chemicals Company, Oak Ridge, Tennessee.

K-1089-C Asphalt Mixing Plant: Mixer Platform Steel Details, Drawing No. D-KS-K 5261H, Carbide and Carbon Chemicals Company, Oak Ridge, Tennessee.

K-1089-C Asphalt Mixing Plant: Storage Tank, Drawing No. D-KS-K 5261D, Carbide and Carbon Chemicals Company, Oak Ridge, Tennessee.

Photograph of Asphalt Plant in Operation, K-25 Site Photo No. K/PH 90-0940, July 10, 1956.

Asphalt Plant in Operation, K-25 Site Photo No. K/PH 90-0942, July 10, 1956.

Date Prepared: August 1994

Date Revised: June 1995

Blair Road Asphalt Plant (1957)

K/PH94-3845

Blair Road Asphalt Plant (1994)

Unit Name: Building 523 Grease Storage

Unit Number: C124

Project Status:

Unit Location: K-25 Site Powerhouse area northeast of the K-709 Switchyard

Approximate Dimensions and Capacity: 50 × 20 ft

Dates Operated: 1943–46

Present Function: Inactive grassy area; the building has been demolished.

Life Cycle Operation: During construction of the K-25 Powerhouse area, this building was used to store heavy and light greases and lube oils in 55- and 30-gal drums, 5-gal buckets, and other containers. Light oils, solvents, antifreeze, etc., were probably also stored there. The building had been removed by March 1946.

Waste Characteristics: Industrial greases and oils

Release Data: According to a retiree who worked at the site, in 1943–45, a railroad carload of off-specification heavy grease was delivered to the K-25 Site. Because the shipment was deemed unsalvageable, approximately one hundred 30-gal, heavy cardboard drums were buried in a shallow trench approximately 100 ft east of the oil storage building. Some cutting and filling appears to have taken place in later years, resulting in the grease being buried deeper than originally.

Site Status: This facility is not maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Subsurface soil and groundwater

Comments:

References:

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

J. A. Jones, *Plan and Profile No. 11, K-25 Power House Area*, Drawing No. 22338, July 17, 1944.

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Date Prepared: August 1994

Date Revised: June 1995

Building 523 Grease Storage

Unit Name: Building 526 Heavy Equipment Shop

Unit Number: C077

Project Status:

Unit Location: K-25 Powerhouse area, approximately 100 ft from the northwest side of the K-709 Switchyard

Approximate Dimensions and Capacity: Approximately 90 by 250 ft

Dates Operated: 1940s

Present Function: The building has been removed, and the pad has been used as an equipment staging area.

Life Cycle Operation: J. A. Jones Building 526 was built and used as a heavy equipment maintenance shop during construction of the K-25 site in the early- to mid-1940s. The shop was used as a gasoline fueling station and as a base of operations for gasoline, diesel and lube oil tankers that were dispatched to the field. Major repairs of engines, hydraulic systems, and body and frame damage were done at the shop. In the spring of 1950 the building was demolished, and combustible scrap was burned.

Waste Characteristics: The following contaminants are associated with gasoline, diesel fuel, lubricating oils, antifreeze, and miscellaneous chemicals used in maintenance shops in the 1940s: tetraethyl lead; ethylene dibromide and dichloride; sulphur and sulphur derivatives; methyl and ethyl alcohol; xylene; toluene; benzene; alpha-methyl naphthalene; naphthenes; aromatics; ethyl nitrate; isoamyl nitrate; acetone peroxide; paratone; acrylic esters; phosphites; tin salts; calcium, barium, and other metallic soaps; passive sulphur-chlorine; lead-active sulphur; naphthenic lube oil; kerosene; turpentine; ethyl alcohol; and ethylene glycol.

Release Data: Reliable information is not available on the disposition of hazardous materials at this unit.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

Date Prepared: January 1993

Date Revised: May 1995

K/PH92-6230

Building 526 Heavy Equipment Shop (1992)

Building 526 Heavy Equipment Shop (ca. 1945)

Unit Name: Building 569 Heavy Equipment Shop

Unit Number: C078

Project Status:

Unit Location: K-25 Site Main Plant Area, outside the perimeter fence approximately 1600 ft due south of the 312 section of the K-25 Building near an existing public address system pole

Approximate Dimensions and Capacity: Approximately 50 × 100 ft

Dates Operated: 1943–48

Present Function: The area where the building once stood is now inactive.

Life Cycle Operation: J. A. Jones Building 569 was built and used as a heavy equipment maintenance shop during construction of the K-25 Site in 1943. The shop was used as a gasoline fueling station and as a base of operations for gasoline, diesel, and lube oil tankers that were dispatched to the field. Major repairs of engines, hydraulic systems, and body and frame damage were done at the shop. Dismantling of the building was completed in March 1948.

Waste Characteristics: The following contaminants are associated with gasoline, diesel fuel, lubricating oils, antifreeze, and miscellaneous chemicals used in maintenance shops in the 1940s: tetraethyl lead; ethylene dibromide and dichloride; sulphur and sulphur derivatives; methyl and ethyl alcohol; xylene; toluene; benzene; alpha-methyl naphthalene; naphthenes; aromatics; ethyl nitrate; isoamyl nitrate; acetone peroxide; paratone; acrylic esters; phosphites; tin salts; calcium, barium and other metallic soaps; passive sulphur-chlorine; lead-active sulphur; naphthenic lube oil; kerosene; turpentine; ethyl alcohol; and ethylene glycol.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance

Media of Concern: Soil, groundwater

Comments:

References:

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

Date Prepared: January 1993

Date Revised: May 1995

Building 569 Heavy Equipment Shop

Unit Name: Building 664 Heavy Equipment Shop

Unit Number: C095

Project Status:

Unit Location: K-25 Site Process Plant Area, underneath the south end of section K-502-2 of the K-29 Building

Approximate Dimensions and Capacity: Approximately 80 × 90 ft

Dates Operated: 1944-45

Present Function: The K-29 Process Building now stands on the entire area once used as the maintenance shop.

Life Cycle Operation: J. A. Jones Building 644 was designed as a heavy equipment shop during construction of the Oak Ridge Gaseous Diffusion Plant in 1944. Evidence suggests, however, that the building was never used as an equipment or maintenance shop and was actually used for offices.

Waste Characteristics: If Building 644 were ever used as an equipment shop, likely contaminants would be lead and organic compounds associated with gasoline and diesel fuel, as well as lubricating oils, antifreeze and other chemicals associated with maintenance and repair facilities.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: The former location of this facility is underneath the K-27 Process Building.

Media of Concern: Soil, groundwater

Comments:

References:

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

Date Prepared: January 1993

Date Revised: June 1995

Unit Name: Building 665 Steam Shed

Unit Number: C121

Project Status:

Unit Location: K-25 Site Main Plant Area, outside the perimeter fence at West Terminal Road and Third Street

Approximate Dimensions and Capacity: Approximately 35 × 35 ft

Dates Operated: 1943–46

Present Function: Inactive; the building has been demolished.

Life Cycle Operation: This building was part of a six-building cleaning operation used by J. A. Jones Construction Company during construction of the K-25 and K-27 cascade buildings. Because of its proximity to an area of heavy and light equipment repair shops, it is believed that this operation was used to clean the undercarriages of construction vehicles that traveled the construction area.

Waste Characteristics: Automobile oils and greases, incidental metals

Release Data: No known releases. Because no construction drawings are available, possible contamination pathways and opportunities for dispersion are unknown.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments:

References:

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Date Prepared: August 1994

Date Revised: June 1995

Building 665

Unit Name: Building F-29 Gasoline Station

Unit Number: C088

Project Status:

Unit Location: K-25 Site Fercleve/Powerhouse Area, on the north side of Thompson Road, about 200 ft west of the intersection of Thompson and Fercleve roads

Approximate Dimensions and Capacity: Approximately 20 × 10 ft

Dates Operated: 1944-45

Present Function: Inactive; the station has been demolished, and no other facilities have been built on the unit. The pump island is still visible.

Life Cycle Operation: The F-29 Gasoline Station was built to support equipment used in the construction and operation of the Fercleve Thermal Diffusion Plant. Construction on the plant began in July 1944. The plant was closed in September 1945. The F-29 station is thought to have been used to fuel tanker trucks that in turn served vehicles in the field. Information is not available on the number and location of the underground fuel storage tanks and whether or not any or all of them were ever removed.

Waste Characteristics: Potential contaminants from gasoline used in the 1940s are tetraethyl lead, ethylene dibromide and dichloride, sulphur, methyl and ethyl alcohol, xylene, toluene, benzene, and alpha-methyl naphthalene. Contaminants from 1940s diesel fuel include naphthenes, aromatics, sulphur, ethyl nitrate, isoamyl nitrate, and acetone peroxide.

Release Data: Reliable information is not available on the disposition of hazardous materials at this unit.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater

Comments:

References:

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

H. K. Ferguson Company, Engineering Services, *General Map S-50 Area*, Ref. FID-5813, Rev. September 19, 1946, by K-25 Operations Office.

Security Fencing at K-770, Drawing No. AW-688-A, Carbide and Carbon Chemicals Corporation, October 9, 1945.

Building Layout, Drawing No. Y-101, Fercleve Corporation, September 10, 1945.

Date Prepared: January 1993

Date Revised: June 1995

K/PH92-6225

Building F-29 Gasoline Station

Unit Name: Demolition Materials Placement Area

Unit Number: C108

Project Status:

Unit Location: K-25 Site External Plant Area, southwest of the K-25 Site, approximately 50 ft east of Oak Ridge Turnpike and 700 ft south of the intersection of Oak Ridge Turnpike and Powerhouse Road.

Approximate Dimensions and Capacity: 1 acre or more

Dates Operated: Unknown

Present Function: Inactive wooded area

Life Cycle Operation: A walkdown of this area revealed concrete and brick demolition rubble over several acres. Undergrowth made exact determinations of the nature and extent of the rubble difficult; however, pieces of concrete slab and portions of brick building were visible. This unit was not an official plant disposal area.

Waste Characteristics: Demolition rubble. A radiation survey in 1994 revealed no contamination.

Release Data: Not applicable

Site Status: This facility is not maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments:

References:

Date Prepared: May 1994

Date Revised: May 1995

Demolition Materials Placement Area

Unit Name: Duct Island Road

Unit Number: C103

Project Status:

Unit Location: K-25 Site External Plant Area, on the peninsula formed by Poplar Creek before its confluence with the Clinch River

Approximate Dimensions and Capacity: 2800 ft long

Dates Operated: Mineral oil was sprayed on the road in 1982.

Present Function: This road is still in use.

Life Cycle Operation: In 1982, 1000 gal of mineral oil was sprayed on Duct Island Road to suppress dust (another 4000 gal was sprayed on K-716 Road). The oil was applied with sprayers attached to drums carried by trucks.

Waste Characteristics: The oils used for dust suppression were tested and rejected if they contained uranium, chlorinated hydrocarbons above the 1% level, or PCBs greater than 5 ppm.

Release Data: The mineral oil used for dust suppression had been used as a diffusion cascade motor lubricant and thus may have contained residual metal contamination.

Site Status: A preliminary assessment/site inspection has been conducted for this unit. The result of the study indicated that the site poses no risk to human health or the environment; consequently no further characterization activities are anticipated for this unit.

Media of Concern: Soil

Comments: This unit is also known as Duct Run Road.

References:

Remedial Site Investigation Report on Duct Island Road, Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-16 & D0 (unpublished draft), Martin Marietta Energy Systems, Inc., January 1991.

Date Prepared: May 1991

Date Revised: February 1995

K/PH91-3131

Duct Island Road

Unit Name: F-05 Laboratory

Unit Number: C119

Project Status:

Unit Location: K-25 Site Fercleve/Powerhouse Area, between K-723 and the Clinch River

Approximate Dimensions and Capacity: Approximately 90 × 45 ft

Dates Operated: 1945

Present Function: Demolished; the laboratory site is currently an inactive grassy area.

Life Cycle Operation: F-05 Laboratory 2 was used as part of the S-50 Thermal Diffusion Complex for determining the assay of UF₆ in process samples through the alpha counting method. After replacing the F-08 Laboratory 1 in August 1945, the laboratory operated until the entire S-50 project was shut down in September 1945. At the close of the S-50 project, the F-05 Building was demolished.

Waste Characteristics: The lab is thought to have been contaminated with UF₆, petroleum oils, and small quantities of mercury.

Release Data: No known releases. A 1995 health physics survey using sodium iodide detectors revealed no beta-gamma activity at the former location of this unit. This unit may have been demolished and buried in place.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Surface soil, groundwater

Comments:

References:

Robert E. Baker, *S-50 Area, Oak Ridge, Tennessee, Contamination Survey for Be and Radioactivity*, Aircraft Nuclear Propulsion Project, General Electric Company, Evendale, Ohio, March 13, 1953.

Aerial Photo 54-616, U.S. Department of Energy Oak Ridge Operations, Oak Ridge, Tennessee, 1954.

Aerial Photo 57-635, U.S. Department of Energy Oak Ridge Operations, Oak Ridge, Tennessee, 1957.

S-50 Area General Map and Site Plan Data From 1946, Drawing No. C1E700000A650, Martin Marietta Energy Systems.

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: August 1994

Date Revised: June 1995

F-05 Laboratory

Unit Name: F-07 Material Warehouse

Unit Number: C117

Project Status:

Unit Location: K-25 Fercleve/Powerhouse Area approximately 50 ft southwest of K-724 along South Ferguson Road

Approximate Dimensions and Capacity: Approximately 90 × 40 ft

Dates Operated: 1944–1950s

Present Function: The building's concrete slab is still in place, and it is currently the site of a temporary tent building.

Life Cycle Operation: Building F-07 was originally used as a stockroom for the S-50 Thermal Diffusion Project, 1944–45. The building was used in the late 1940s and early 1950s for the Aircraft Nuclear Propulsion Project. The building was standing in 1954; by 1957, it had been demolished.

Waste Characteristics: A radioactivity survey in 1953 revealed trace amounts of radioactivity in a room used to store calibration sources and small amounts of waste material. The survey also showed several patches of the ground around the building to have detectable levels of radioactivity. At the time of the survey, plans were made to decontaminate radioactive areas; however, no information is available on the extent, if any, of that decontamination effort.

Release Data: Surveys in the early 1950s revealed that radioactivity had been released at certain locations around the building. These radioactive areas are presumed to have been excavated; however, no definitive information is available on such efforts.

Site Status:

Media of Concern: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Comments: Surface soil

References:

Project S-50 Material Control Section Exhaust System Layout and Hood Details, Drawing Contract No. W-7409 Eng. 100; Sheet No. 600, Fercleve Corporation, May 5, 1945.

Project S-50 Material Building Floor Plan, Drawing Contract No. W-7409 Eng. 100; Sheet No. F-07-101, Fercleve Corporation, July 28, 1945.

Project S-50 Material Building, Plumbing— Soil and Water Lines, Drawing Contract No. W-7409 Eng. 100; Sheet No. F-07-200, Fercleve Corporation, July 28, 1945.

Project S-50 Material Building, Electrical, Drawing Contract No. W-7409 Eng. 100; Sheet No. F-07-400, Fercleve Corporation, August 24, 1945.

Robert E. Baker, *S-50 Area, Oak Ridge, Tennessee, Contamination Survey for Be and Radioactivity*, Aircraft Nuclear Propulsion Project, General Electric Company, Evendale, Ohio, March 13, 1953.

Aerial Photo 54-616, U.S. Department of Energy Oak Ridge Operations, Oak Ridge, Tennessee, 1954.

Aerial Photo 57-635, U.S. Department of Energy Oak Ridge Operations, Oak Ridge, Tennessee, 1957.

S-50 Area General Map and Site Plan Data From 1946, Drawing No. C1E700000A650, Martin Marietta Energy Systems.

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Date Prepared: August 1994

Date Revised: June 1995

F-07 Material Warehouse

Unit Name: F-08 Laboratory

Unit Number: C122

Project Status:

Unit Location: K-25 Site Fercleve/Powerhouse Area; immediately southwest of K-724 along South Ferguson Road.

Approximate Dimensions and Capacity: Approximately 65 × 45 ft

Dates Operated: 1944–1950s

Present Function: The laboratory building has been demolished. A concrete loading ramp is now located over the former laboratory area.

Life Cycle Operation: F-08, designated Laboratory 1, was put into service in 1944 to determine the assay of UF₆ process samples from the S-50 Thermal Diffusion Plant. The laboratory used mass spectrography until it was replaced by the F-05 Laboratory 2 in August 1945. A month later, the entire S-50 project was shut down. During the late 1940s and early 1950s, the F-08 Building was used as part of the Aircraft Nuclear Propulsion Project. By 1957 it had been demolished. Two additions to the northern end of the original F-08 Building are still in place as K-724.

Waste Characteristics: A radioactivity survey in 1953 revealed radioactive beryllium contamination on remaining equipment in three rooms. Several rooms in the building were found to be radioactively contaminated. Plans were made at the time of the survey to decontaminate the building; however, no records are available describing any such decontamination activities.

Release Data: After demolition, this building may have been buried on site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Undetermined

Comments:

References:

Robert E. Baker, *S-50 Area, Oak Ridge, Tennessee, Contamination Survey for Be and Radioactivity*, Aircraft Nuclear Propulsion Project, General Electric Company, Evendale, Ohio, March 13, 1953.

Aerial Photo 54-616, U.S. Department of Energy Oak Ridge Operations, Oak Ridge, Tennessee, 1954.

Aerial Photo 57-635, U.S. Department of Energy Oak Ridge Operations, Oak Ridge, Tennessee, 1957.

S-50 Area General Map and Site Plan Data From 1946, Drawing No. C1E700000A650, Martin Marietta Energy Systems.

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Date Prepared: August 1994

Date Revised: June 1995

Unit Name: Flannagan's Loop Road

Unit Number: C102

Project Status:

Unit Location: K-25 External Plant Area, between Highway 58 and Bear Creek Road

Approximate Dimensions and Capacity: 4000 ft long

Dates Operated: Mineral oil was sprayed on the road in 1982 and 1983 for dust suppression.

Present Function: The road has been closed.

Life Cycle Operation: In 1982 and 1983, approximately 18,000 gal of waste mineral oil was sprayed on the road for dust suppression. The oil was applied with sprayer attached to drums that were carried by trucks.

Waste Characteristics: The oil used for dust suppression had been used as a motor lubricant. Consequently, the possibility exists for residual metal and petroleum hydrocarbon contamination.

Release Data: The mineral oil was sampled for analysis of uranium, chlorinated hydrocarbons, and polychlorinated biphenyls before it was approved for use as a dust suppressant.

Site Status: A preliminary assessment/site inspection has been conducted for this unit. The result of the study indicated that the site poses no risk to human health or the environment. Consequently, no further action is anticipated to determine the risk posed by this unit.

Media of Concern: Soil

Comments:

References:

Date Prepared: May 1991

Date Revised: February 1995

Flannagan's Loop Road

Unit Name: J. A. Jones Cleaning Area

Unit Number: C120

Project Status:

Unit Location: This five-building complex was centered approximately 500 ft east of the 302 portion of the K-25 Building in the Main Plant Area.

Approximate Dimensions and Capacity: These buildings were situated within an approximately 4-acre area; because building drawings have not been found, exact dimensions are unavailable.

Dates Operated: 1943–46

Present Function: The buildings have been demolished. Current uses in the area are the K-1423 and K-1415 buildings and K-1066-A Cylinder Storage Yard.

Life Cycle Operation: Buildings 631 (Pipe Cleaning Building No. 1), 633 (Sandblasting Building), 637 (Degreasing Shed No. 2), 674 (Motor Base Cleaning), and 675 (Pipe Degreasing) were cleaning facilities operating by the J. A. Jones Construction Company during the initial construction of the K-25 and K-27 cascade buildings during World War II. These cleaning buildings were used to clean cascade piping and other equipment to exacting standards.

Waste Characteristics: No hazardous wastes are thought to have been generated at the 633 Sandblasting Building. Possible contamination from the remaining cleaning and degreasing facilities may have included chromic acid, various petroleum lubricants, freons, trichloroethane, and degreasing solvents such as carbon tetrachloride or acetone.

Release Data: No known releases. Because no construction drawings are available, possible contamination pathways and opportunities for dispersion are unknown.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments: Potential contamination from these sources will be addressed in future decontamination and decommissioning and/or remedial actions projects for facilities currently located in this area.

References:

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Date Prepared: August 1994

Date Revised: June 1995

J. A. Jones Cleaning Area

Unit Name: J. A. Jones Disposal Area

Unit Number: C107

Project Status:

Unit Location: K-25 Site Main Plant Area, approximately 100 ft southwest of the K-25 Site Contractors Road, midway between Avenues M and J. The tip of the northern inlet to the K-1007-P1 Pond now covers most of this area.

Approximate Dimensions and Capacity: 2-3 acres

Dates Operated: 1944-45

Present Function: Northern inlet of the K-1007-P1 Pond and inactive grassy area immediately surrounding it

Life Cycle Operation: During the decommissioning of initial construction activities of the K-25 Site, incidental and unofficial above ground disposal of construction debris was carried out at this location. The site was used for common trash and was not intended as a dedicated long-term disposal area.

Waste Characteristics: Concrete batch plant residue

Release Data: No known releases

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments:

References:

Date Prepared: May 1994

Date Revised: June 1995

J. A. Jones Disposal Area

Unit Name: J. A. Jones Maintenance Complex

Unit Number: C130

Project Status:

Unit Location: K-25 Site External Plant Area. The bulk of this unit is located in a triangular area bounded by Powerhouse Road, 1st Avenue South, and South Gallaher Road. A small portion of the facility is located on the other (west) side of South Gallaher Road.

Approximate Dimensions and Capacity: 10 acres; one 385 × 50-ft building with fuel pumps, two smaller gas stations with fuel pumps, and small accessory buildings

Dates Operated: 1944–46

Present Function: All buildings have been demolished except for concrete pads. The Bear Creek/South Gallaher Road extension now runs through the northernmost portion of the main building. Remnants of the 484 Gasoline Station suggest that its tank is still in the ground. An air monitoring station is now located adjacent to the Building 470 pump island, which is still intact.

Life Cycle Operation: The J. A. Jones Construction Co. Maintenance Complex was centered around a large maintenance building used for servicing construction vehicles. This building consisted of the following shops: 454 Hercules Truck Repair, 455 Radiator Repair, 456 Tire and Battery, and 483 Motor Pool Tire and Battery. The floor was poured concrete on tamped earth; the siding and roof were probably wood and rolled roof, respectively. A two-pump gasoline island was located immediately north of the building's western end. By 1955 the building had been demolished, and a portion of South Gallaher Road ran through its easternmost end. A mound of dirt is visible at the site of the two-pump island, and much of the main building's concrete pad remains.

Another three-pump gasoline station, designated Building 470, was located north of the main building's eastern end. Extant drawings, which show an above-ground fuel tank, suggest that this station may not have used an underground storage tank (UST). Although the station and pumps had been removed by 1955, the building pad and pump island remain. Repeated walkovers of the unit have failed to uncover a UST fill pipe. Between this station and Powerhouse Road, there was a small oil and antifreeze storage shed believed to have been designated Building 473 or 485; no sign of this building remains.

A third fueling operation, this one a two-pump island, was located approximately 90 ft northwest of the main building's northwest corner. Although the building, designated 484, and the pump island have been removed, a UST fill pipe, located within a small concrete-walled enclosure, is still intact.

Waste Characteristics: Possible contaminants include leaded gasoline, kerosene and diesel fuel, lubricating oils and grease, antifreeze, and miscellaneous solvents.

Release Data: No known releases

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Subsurface soil, groundwater

Comments: This unit has in the past been identified with the K-1085 Old Firehouse Burn Area, which is located nearby. However, because the maintenance facility was operationally separate, and is now separated from the burn area by South Gallaher Road, it is identified here as a discrete facility.

References:

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

Camp Construction Area, Sanitary Water, Drawing No. 20713, J. A. Jones Construction Co., July 7, 1944.

K-25 Camp Construction Area, Sanitary Sewer, Drawing No. 2091, J. A. Jones Construction Co., July 7, 1944.

Fire Protection Lines, Drawing No. 20741, J. A. Jones Construction Co., November 30, 1944.

Aerial Photo No. 530, J. A. Jones Campsite Area, U.S. Department of Energy, Oak Ridge Operations, Oak Ridge, Tennessee, circa 1955.

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 and K-27 Plot Plan, Rev. 3, Drawing No. AW-1M, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Aerial Photo No. MED 273, J. A. Jones Construction Areas, U.S. Department of Energy, Oak Ridge Operations, Oak Ridge, Tennessee, circa 1946.

Date Prepared: August 1994

Date Revised: May 1995

K/PH94-3810

J. A. Jones Maintenance Complex

K/PH94-3826

J. A. Jones Maintenance Complex

Unit Name: K-25 Process Building

Unit Number:

Project Status:

Unit Location: At the center of the K-25 Site

Approximate Dimensions and Capacity: 4.45 million ft² total floor area on three levels

Dates Operated: 1945–1964

Present Function: Vaults on the ground floor of the building are used for a variety of waste storage activities. Offices have been located in portions of K-303-7 and K-303-8. A portion of K-304 serves as an information data file station. The largest portions of the building are shutdown awaiting decontamination and decommissioning.

Life Cycle Operation: The K-25 Building, the first process building at the Oak Ridge Gaseous Diffusion Plant, was placed in operation in August 1945 for the isotopic enrichment of uranium by gaseous diffusion. Throughout most of its operation, the building produced high assay ²³⁵U. The building was shut down in 1964.

The K-25 Building is a steel frame structure with cement/asbestos composite siding. It is a three-level U-shaped building measuring 4975 feet along the "U." The facility's width varies around the U with an average width of approximately 400 ft. The building is 58 ft high.

Waste Characteristics: Uranium enrichment products, including highly enriched uranium, is present in and on equipment in the building. Primary contaminants of concern are ²³⁸U, ²³⁵U, and ⁹⁹Tc. Traces of transuranics are present. PCBs, asbestos, various metals, and chlorofluorocarbons are other contaminants.

Release Data: Process gas leaks are known to have occurred into the K-25 Process Building. Much of the perimeter around the K-25 Building is roped off as radiological areas.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building equipment and surfaces

Comments: The following building units are included in this facility:

K-301-1	K-303-1	K-303-10	K-305-4	K-305-12	K-310-2
K-301-2	K-303-2	K-304-1	K-305-5	K-306-1	K-310-3
K-301-3	K-303-3	K-304-2	K-305-6	K-306-2	K-312-1
K-301-4	K-303-4	K-304-3	K-305-7	K-306-7	K-312-2
K-301-5	K-303-5	K-304-5	K-305-8	K-309-1	K-312-3
K-302-1	K-303-6	K-305-1	K-305-9	K-309-2	
K-302-3	K-303-7	K-305-2	K-305-10	K-309-3	
K-302-4	K-303-8	K-305-3	K-305-11	K-310-1	
K-302-5	K-303-9				

During World War II this building was also known as the 300 Building and as the Process Area.

There are classification concerns associated with portions of this building.

References:

D. A. Kucsmas, *K-25/K-27 Buildings Historical Characterization*, K/D-6052, Engineering Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Oak Ridge, Tennessee, September 1992.

K-25 Building Characterization Report, K/D-574B, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 1988.

Phase I Hazard Screening Analysis for the K-25 Process Building, HS/K-25/PK/20.0/R0, Martin Marietta Energy Systems, Oak Ridge, Tennessee, March 1992.

Date Prepared: June 1995

K-25 Process Building

Unit Name: K-25 Site Contractor's Spoil Area

Unit Number: C105

Project Status:

Unit Location: K-25 Site External Plant Area, approximately 300 ft north of Perimeter Road, approximately 600 ft west of Blair Road

Approximate Dimensions and Capacity: 7.5–8 acres

Dates Operated: Approximately 1974–1985

Present Function: The site is no longer used as a spoils area, and access has been restricted by a gate across the road. The entire area, other than gravel roads, is covered by vegetation. A portion of the area is used for burning clean pallets.

Life Cycle Operation: This area was opened in 1974 as a borrow pit by the Tennessee Valley Authority for construction of the Roane substation. During the late 1970s, the area was designated as a construction spoils and noncontaminated disposal area for the K-25 Site. However, a few disposal records indicate that hazardous material may also have been disposed of at the site. In 1982–83, a total of 13,750 gal of oil was land farmed onto roads into and through the area for dust suppression. The oil used for dust suppression had been tested and rejected if it contained uranium, chlorinated hydrocarbons above the 1% level, or PCBs (polychlorinated biphenyls) greater than 5 ppm.

Two or three burial pits existed at this area. The pits were reportedly 10–12 ft deep, 6 ft in diameter, and located about 50 yards up the right-hand side of the perimeter road. These pits reportedly received a variety of aerosol cans, paint, lubricants, etc.

Remedial measures, including capping and seeding, began in 1985, and closure of the area was approved by the Tennessee Department of Health and Environment in 1987.

Waste Characteristics: Steam plant ash, spent aerosol cans, roofing debris, poles, cleaning compound, linoleum, plastic bags of oil sorbent, oily rags, hydrated lime, transite, plastic pipe, soda ash, calcium carbonate sludge, metal shavings, lime grit, grinder dust, wood pallets, rejected HEPA (high-efficiency particulate air) filters, asphalt, deicing fluid, oil filters, rust inhibitor, treated recirculated cooling water, Betz inhibitor, Dearborne 537, Zorball, clarifier slurry, chromated sludge, coal tar, waste oil and kerosene, Bentonite, paraffin, caustic cleaning solution, steel fence posts, non-asbestos insulation, sheetrock, lumber, tile, construction rubble, etc. Although the disposal of hazardous materials at this facility was administratively prohibited, requests for disposal indicate that 24 loads of hazardous material and one load marked radioactive were disposed of in this unit. Records indicate that these potentially hazardous materials included waste oil, zinc sulfate, sodium bichromate, sodium sulfate, sodium hexametaphosphate, soda ash, sodium hydroxide, and $\text{Cu}_4(\text{OH}_3)$.

Release Data: No known releases

Site Status: This facility is still used for open burning of scrap lumber.

Media of Concern: None

Comments: This unit is also known as the TVA Borrow Pit.

References:

D. S. Pesce, *Hazardous Waste Sites Historical Investigations: Site 35-R: ORGDP Contractor's Spoil Area North of Poplar Creek and West of Blair Road*, Environmental Restoration Program, Lockheed Martin Energy Systems, Oak Ridge, Tennessee, June 1995.

ORGDP Spoil Area Location, Drawing No. C1E-48960-A, Martin Marietta Energy Systems, Oak Ridge, Tennessee.

Transmittal of Request for Disposal Summary, Letter from P. L. Goddard, K-25 Environmental Restoration Program (Energy Systems) to G. W. Bodenstein, K-25 Environmental Restoration Program (DOE), Letter No. ER-K-94/302, November 22, 1994.

ORGDP Contractor's Spoil Area—Capping Plan, C1E-48960-C.

Letter from Rick Brown, Tennessee Department of Health and Environment, to Joe Haymore, Martin Marietta Energy Systems, September 18, 1987.

P. L. Goddard, *Preliminary Assessment for the K-25 Site Contractor's Spoil Area*, K/ER-160, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1994.

Date Prepared: May 1994

Date Revised: June 1995

K-25 Site Contractor's Spoil Area

Unit Name: K-25 Site North Trash Slope

Unit Number: C106

Project Status:

Unit Location: Running on the south side of Poplar Creek from the outfall of Mitchell Branch to a point directly north of K-1025-C.

Approximate Dimensions and Capacity: 7 acres

Dates Operated: Early 1940s to mid-1950s

Present Function: K-1066-F and K-1066-J cylinder storage yards and the bank north of these yards

Life Cycle Operation: This site was used for unofficial above-ground dumping of scrap metal, lumber, instruments, oils and solvents. The trash slope was used for common trash disposal and was not a dedicated long-term waste disposal area. The area was later cleaned, and uranium hexafluoride cylinder yards were built in its place. Aerial photographs give information on the use of this area. A photograph from ca.1946 (MED 261) shows the area in use as a trash area. Partial cleanup of this area appears to have begun by 1950 (Photo No. 5903). The area appears relatively clear by 1957 (57-622), and again in 1969 (69-477-C).

Wastes at the area are thought to have been covered over and buried before construction of the UF₆ Cylinder Yard began in 1974. Trashing was later resumed on the bank of Poplar Creek after it turns north along the west bank of the creek. This area was cleaned up by Roads and Grounds, and most of the trash was hauled to the K-770 Scrap Metal Yard. However, some trash is still visible at this area.

Waste Characteristics: Materials thought to have been disposed of on the trash slope include scrap metals, lumber, piping, potentially uranium- and mercury-contaminated instruments, and buckets of organic solvents and oils.

Release Data: No known releases

Site Status: This facility is not maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments: None

References:

The following Manhattan Engineer District, Atomic Energy Commission, and Union Carbide photographs show conditions on the North Trash Slope, MED 261, ca. 1946; 5903, 1950; 57-622, 1957; 69-477-C, 1969.

Date Prepared: May 1994

Date Revised: May 1995

K-25 Site North Trash Slope

Unit Name: K-25/K-27 Tielines, Outdoor Process

Unit Number: R184a

Project Status:

Unit Location: These tielines run between the southwest corner of the K-25 Process Building and the K-27/K-29 buildings.

Approximate Dimensions and Capacity: The tielines are composed of multiple UF₆ distribution pipes of 3–42-in. diameter.

Dates Operated: 1948–1963

Present Function: Inactive. When enrichment operations were discontinued, the volatile UF₆ inventory was evacuated, and the tielines were purged and isolated from the process system by closure of valves in the K-27 and K-29 buildings.

Life Cycle Operation: These tielines allowed for the distribution of UF₆ process gas between the buildings housing the enrichment cascades. The pipes were enclosed in thermally insulated housing and were provided with hot air or steam heat and temperature-control instrumentation to prevent condensation of UF₆ process inventory. This process tie line between K-311-1 and K-402-9 is unique because the piping is enclosed for most of its length in a half-cylindrical insulated aluminum housing supported by concrete piers near ground level.

Waste Characteristics: Uranium, Technetium-99. A residual nonvolatile fluoride or oxyfluoride of uranium and possible technetium, plutonium, and neptunium remain on the internal surfaces of the tieline piping.

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Inside pipes

Comments:

References:

D. A. Kucsmas, *K-25/K-27 Buildings Historical Characterization*, K/D-6052, Engineering Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Oak Ridge, Tennessee, September 1992.

Date Prepared: June 1995

K-25/K-27 Tielines, Outdoor Process

Unit Name: K-27 Process Building

Unit Number:

Project Status:

Unit Location: Southwest corner of the K-25 Site, southwest of K-25 Building

Approximate Dimensions and Capacity: 257,171 ft² floor area. The building measures 960 ft east-west and 405 ft north-south. The building has three floors and a total height of 65 ft.

Dates Operated: 1945–85

Present Function: Inactive

Life Cycle Operation: The K-27 Building, which began operations in December 1945, was the second cascade brought on line for isotopic enrichment of uranium, and was tied to K-25 in 1946. The entire unit was shut down in 1964. In 1977, the top two units, K-402-8 and K-402-9, were returned to service as the top purge system for the diffusion plant. These two units were shut down in 1985.

This is a steel frame building with concrete floors in the basement and vault areas, concrete cell platform and withdrawal alley floors on the next level, steel catwalk grating for personnel access at the pipe gallery level, and a concrete operating level top floor. Exterior walls are of cement/asbestos composite panels. The roof decking and third floor levels could conceivably have structural integrity problems within the next 10 years.

Waste Characteristics: Uranium (including ²³⁵U), ⁹⁹Tc, various transuranics (including ²³⁷Np), PCBs, asbestos, various metals and chlorofluorocarbons

Release Data: Releases of process gas inside the K-27 Building are known to have occurred. External contamination from this event is possible, although almost all of the material would have remained inside the building.

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building and equipment

Comments: K-27 includes the following building units: K-402-1, K-402-2, K-402-3, K-402-4, K-402-5, K-402-6, K-402-7, K-402-8, and K-402-9. Vaults 32-A and 34-A are also included in this facility. There are classification concerns associated with this facility.

References:

D. A. Kucsmas, *K-25/K-27 Buildings Historical Characterization*, K/D-6052, Engineering Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Oak Ridge, Tennessee, September 1992.

Summary of the NDA Survey in the K-27 Building, ESP 89-284, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, August 1980.

J. C. Bailey, *Radionuclides in the Equipment of the Oak Ridge Gaseous Diffusion Plant*, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 1988.

Phase I Hazard Screening Analysis for K-27 Process Building, HS/K-27/PK/21.2R0, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 1992.

K-25 D&D Strategic Plan, U.S. Government Memorandum from Jane Powell, DOE-ORO Environmental Restoration Division, to Tom Tison, DOE K-25 Site Manager, Oak Ridge, Tennessee, August 31, 1994.

Date Prepared: June 1995

K-27 Process Building

Unit Name: K-27 Tielines, Outdoor Process

Unit Number: R184b

Project Status:

Unit Location: K-25 Site Process Plant Area. Five different sets of tielines run from the K-27 Building to the following facilities: K-131, K-413, K-631, K-633, and K-1131.

Approximate Dimensions and Capacity: The tielines are composed of multiple UF₆ distribution pipes of 3- to 42-in. diameter.

Dates Operated: 1946–1985

Present Function: Inactive. When enrichment operations were discontinued, the volatile UF₆ inventory was evacuated, and the tielines were purged and isolated from the process system by closure of valves in the interconnection buildings.

Life Cycle Operation: These tielines allowed for the distribution of UF₆ process gas between the enrichment cascades. The pipes were enclosed in thermally insulated housing and were provided with hot air or steam heat and temperature control instrumentation to prevent condensation of UF₆ process inventory.

Waste Characteristics: Uranium, Technetium-99. A residual nonvolatile fluoride or oxyfluoride of uranium and possible technetium, plutonium, and neptunium remain on the internal surfaces of the tieline piping.

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Pipes

Comments:

References:

D. A. Kucsmas, *K-25/K-27 Buildings Historical Characterization*, K/D-6052, Engineering Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Oak Ridge, Tennessee, September 1992.

Date Prepared: February 1995

K-27 Tielines, Outdoor Process

K-27 Tielines, Outdoor Process

K-27 Tielines, Outdoor Process

K-27 Tielines, Outdoor Process

K-27 Tielines, Outdoor Process

Unit Name: K-27/29 Recirculating Cooling Water Lines

Unit Number: C003h

Project Status:

Unit Location: K-25 Site Process Plant Area, west of the K-27 and K-29 buildings

Approximate Dimensions and Capacity: 2900 linear ft, 3–10 ft deep, 16–54-in. diameter; 55,000 gpm

Dates Operated: 1945–1985

Present Function: Inactive. The above-ground portions of the recirculating cooling water (RCW) lines are rusting.

Life Cycle Operation: Recirculation of cooling process waters to cool heat transfer systems

Waste Characteristics: A chromate/zinc/phosphate treatment was used to prevent RCW system scaling. A pentachlorophenol fungicide treatment, which contains or degrades to traces of dioxin, may have been used on this system's cooling tower.

Release Data: There have been five known releases of potentially hazardous materials from different operating parts of the K-27/29 RCW lines. In 1958, a supply header sank sufficiently to break a building header in K-27. In 1968, riser pipes developed leaks at and below ground level. Repairs included welding on steel sleeves, taping and painting and back filling with clay instead of gravel to prevent external corrosion. In 1969, a header break was caused by subjection to excessive high pressure and probably promoted by the use earlier of concentrated acid to clean K-27 coolers. In 1975, a supply header developed a leak that was caused by attack from galvanic corrosion. Gravel was replaced by clay to arrest corrosion. In 1979, the 54-in. header supplying the tower risers developed a leak. A cover sleeve was welded over the pipe, and clay backfill was added.

Site Status: Valve vaults within this unit are under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: This unit is part of the K-27/29 RCW system, which also includes the K-832 Pumphouse and K-832-H Cooling Tower. Valve vaults K-835, K-836, K-837 and K-838 are associated with this system.

References:

R. A. Kite, M. S. Settle, and M. A. Rold, *K-25 Site Recirculating Cooling Water Valve Vault Assessment Corrective Action: Phase I*, K/ER-243, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1995.

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: June 1995

K-27/29 Recirculating Cooling Water Lines

Unit Name: K-29 Process Building

Unit Number: R151

Project Status:

Unit Location: Southwest portion of K-25 Site, immediately west of K-27 Process Building

Approximate Dimensions and Capacity: 484,587 ft² floor area; 560 × 523 ft outside dimension; 55 ft high

Dates Operated: 1951–1985

Present Function: All enrichment operations were discontinued in 1985. Portions of the building are used for storage of waste materials.

Life Cycle Operation: The K-29 Building was placed in operation in 1951 for the isotopic enrichment of uranium by gaseous diffusion. Units K-502-2 and K-502-3 were permanently shut down in 1968. The entire building was shut down in 1985.

The layout of the K-29 Building has only two levels: the process equipment on the upper (or cell floor) level, and the lower or basement level is the operating floor and includes the central control room. The lower level also contains the lubrication oil drain tanks, circulating pumps, coolers and filters, R-114 coolant drain tanks and transfer pumps, electrical transformers and switchgear, air intake filter rooms, and ventilation fans and ducts. K-29 is a steel-frame structure with cement/asbestos siding.

There are evidence and reports of construction waste disposal in an area that is now under the northwest corner of the building. During site preparation, soil in this area was found to contain leaves and tree branches 5–12 ft below grade, and there was evidence of extensive cut and fill operations. The Building 664 Heavy Equipment Shop, located where the south end of Section K-502-2 of the K-29 Building is now located, is discussed in a separate report. Documentation of soil and bedrock conditions at the construction site are discussed in the building's completion report.

Waste Characteristics: Uranium (including ²³⁵U), technetium, transuranics (including ²³⁷Np), asbestos, PCBs, various metals and chlorofluorocarbons

Release Data: Contamination from releases within this building would be limited almost exclusively to the building itself.

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building and equipment

Comments: Contiguous buildings within this facility are K-502-1, K-502-2, and K-502-3. There are classification concerns associated with this facility.

References:

Nondestructive Assay Survey of Building K-29, ESP 91-225, September 1991.

J. C. Bailey, *Radionuclides in the Equipment of the Oak Ridge Gaseous Diffusion Plant*, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 1988.

Date Prepared: May 1995

K-29 Process Building

Unit Name: K-31 Process Building

Unit Number: R160

Project Status:

Unit Location: On the western edge of the K-25 Site

Approximate Dimensions and Capacity: 1200 × 622 ft; 1.66 million ft² total floor area; 67 ft tall

Dates Operated: 1951–1985

Present Function: Enrichment operations have been discontinued. Portions of the building are used for waste storage.

Life Cycle Operation: Building K-31 was placed in operation in 1951 for the isotopic enrichment of uranium by gaseous diffusion. The building was shut down in 1985.

The K-31 Building is built of steel with cement/asbestos composite siding. The operating floor contains the process control room, offices, maintenance shops, and auxiliary equipment such as electrical switchgear, ventilation fans and ducts, process control and instrument consoles, lube oil storage tanks, chlorofluorocarbon evaporative coolant storage tanks, and vacuum pumps with chemical sorbent traps. The enrichment process equipment is located on the cell floor.

Waste Characteristics: Uranium, including ²³⁵U, ⁹⁹Tc, transuranics (including ²³⁷Np), PCBs, asbestos, and various metals and chlorofluorocarbons

Release Data: Contamination from releases within the building would have remained almost exclusively within the building.

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building and equipment

Comments: Contiguous buildings within this facility are the following cells: K-602-1, K-602-2, K-602-3, K-602-4, K-602-5, K-602-6. There are classification issues associated with these units.

References:

Nondestructive Assay Survey of Building K-31-Summary Report, ESP 91-263, September 1991.

J. C. Bailey, *Radionuclides in the Equipment of the Oak Ridge Gaseous Diffusion Plant*, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 1988.

Phase I Hazard Screening Analysis for the K-31 Process Building, HS/K-31/PK/23.2/R0, March 1992.

Date Prepared: February 1995

K-31 Process Building

Unit Name: K-31 Recirculating Cooling Water Lines

Unit Number: C003j

Project Status:

Unit Location: K-25 Site Process Plant Area immediately east of the K-31 Building

Approximate Dimensions and Capacity: 10,000 linear ft; 3–7 ft deep; 24–48-in. diameter; 87,000 gpm

Dates Operated: 1951–1985

Present Function: Inactive. Exposed piping is rusting.

Life Cycle Operation: System provided RCW (recirculating cooling water) for K-31 Cascade. System has been out of use since the Oak Ridge Gaseous Diffusion Plant ceased operations in 1985.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control throughout operations. In 1969, a Martreat system (TM) was used to control biological attack in the system's cooling tower. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate, and zinc chromate. A pentachlorophenol fungicide treatment, which contains or degrades to traces of dioxin, may have been used on this system's cooling tower.

Release Data: In 1956, a leak caused by localized galvanic action occurred in the south K-862 supply header. Cathodic protection systems were installed. In 1968, seepage occurred at ground level.

Site Status: The cooling towers associated with this system have been demolished as part of the Cooling Tower Demolition Project. The basin is being cleaned and left in place as a fill area. Underground piping will be capped or plugged and left in place.

Valve vaults within this unit are under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: This unit is part of the entire K-31 RCW system, which also includes the K-862 Pumphouse and the following valve vaults: K-863-A, -B, -C, -D, K-864, K-865, K-865-C, K-866, K-866-A, K-867, K-868, K-869, K-870, K-871, K-872, K-873, and K-874.

References:

R. A. Kite, M. S. Settle, and M. A. Rold, *K-25 Site Recirculating Cooling Water Valve Vault Assessment Corrective Action: Phase 1*, K/ER-243, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1995.

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: June 1995

K-31 Recirculating Cooling Water Lines

Unit Name: K-31/K-631 Tielines, Outdoor Process

Unit Number: R184c

Project Status:

Unit Location: K-25 Site Process Plant Area, from the K-31 Building, across Poplar Creek to Building K-631

Approximate Dimensions and Capacity: Tielines area composed of multiple UF₆ distribution pipes of 3–42-in. diameter.

Dates Operated: 1951–1985

Present Function: Inactive. When gaseous diffusion operations were stopped in 1985, the volatile UF₆ inventory was evacuated, and the tie lines were purged and isolated from the process system by closing the valves in the interconnection buildings.

Life Cycle Operation: UF₆ tielines provided for the distribution of process gas between the enrichment cascades. The pipes are enclosed in thermally insulated housings and were provided with hot air or steam heat and temperature control instrumentation to prevent condensation of UF₆ process inventory.

Waste Characteristics: A residual nonvolatile fluoride or oxyfluoride of uranium and possible technetium, plutonium, and neptunium remain on the internal surfaces of the tieline piping.

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Pipes

Comments:

References:

Date Prepared: February 1995

K-31/631 Tielines, Outdoor Process

Unit Name: K-33 Process Building

Unit Number: R162

Project Status:

Unit Location: Northwest corner of the K-25 Site

Approximate Dimensions and Capacity: 1450 × 970 ft, with total floor area of 2.8 million ft². The building is 82 ft high.

Dates Operated: 1954–1985

Present Function: Inactive. Portions of the building are used for hazardous waste storage.

Life Cycle Operation: Construction on K-33 began in July 1952. The building was placed in operation in March 1954 as the largest and last of the ORGDP cascades for the isotopic enrichment of uranium. The building was shut down in 1985.

The K-33 Building is built of steel with cement/asbestos composite siding. Each floor of the building has 64 acres of floor space. The first floor is the operating floor; it contains the process control room, offices, maintenance shops, and auxiliary equipment such as electrical switch gear, ventilation fans and ducts, process control instrument codes, lube oil storage tanks, chlorofluorocarbon evaporative coolant storage tanks, and vacuum pumps with chemical solvent traps. The UF₆ enrichment process equipment is located on the second, or cell, floor.

Waste Characteristics: Uranium, including enriched uranium, is a primary contaminant of concern in and on equipment. Other contaminants include ⁹⁹Tc, transuranics such as ²³⁷Np, asbestos, PCBs, and a variety of metals and chlorofluorocarbons.

Release Data: Contamination from releases within the building would have remained almost exclusively within the process building.

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building and equipment

Comments: Contiguous buildings within this building include the following cells: K-902-1, K-902-2, K-902-3, K-902-4, K-902-5, K-902-6, K-902-7, and K-902-8. There are classification concerns associated with the entire process building.

References:

Nondestructive Assay Survey of Building K-33, ESP 91-264, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, September 1992.

J. C. Bailey, *Radionuclides in the Equipment of the Oak Ridge Gaseous Diffusion Plant*, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 1988.

Hazard Screening Document for Building K-33, HS/K-33/PD/28.2/R0, March 1992.

Date Prepared: May 1995

K-33 Process Building

Unit Name: K-33 Recirculating Cooling Water Lines

Unit Number: C003k

Project Status:

Unit Location: K-25 Site Process Plant Area, immediately east of the K-33 and K-31 buildings

Approximate Dimensions and Capacity: 12,500 linear ft; 3–7 ft deep; 12–60-in. diameter; 347,000 gpm

Dates Operated: 1954–1985

Present Function: Inactive. Lines to the K-892-G basin are corroding.

Life Cycle Operation: Recirculation cooling process waters to cool heat transfer systems

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control. In 1963 and 1973, a Martreat system (TM) was used to control biological attack. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate, and zinc chromate. In the early 1960s, the Steam Chem system (TM), which contains semi-volatile organics, was used to fight biological attack in cooling towers. A pentachlorophenol fungicide treatment, which contains or degrades to traces of dioxin, may have been used on this system's cooling towers.

Release Data: In 1968 seepage caused by gravel backfill permitting oxygen to penetrate underground occurred around the K-892 risers. In 1970 a large leak caused by galvanic action of the building ground grid laying on top of the header occurred in the north supply header of K-892.

Site Status: The cooling towers and basins associated with this system are being demolished as part of the Cooling Tower Demolition Project. Underground piping will be capped or plugged and left in place. Valve vaults within this unit are under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: The following valve vaults are also part of this RCW system: K-893-A, -AA, -B, -BB, -C, -CC, -D, -DD, -E, -EE, -F, -FF, -G, -H, -J, -K, -L, -M, -N, -O, -P, -Q, -R, -S, -T, -U, -V, -W, -X, and -Z.

References:

R. A. Kite, M. S. Settle, and M. A. Rold, *K-25 Site Recirculating Cooling Water Valve Vault Assessment Corrective Action: Phase I*, K/ER-243, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1995.

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: June 1995

K-33 Recirculating Cooling Water Lines

K/PH91-3145

K-33 Recirculating Cooling Water Lines

Unit Name: K-33/K-31 Tielines, Outdoor Process

Unit Number: R184d

Project Status:

Unit Location: K-25 Site Process Plant Area between buildings K-33 and K-31

Approximate Dimensions and Capacity: Tielines are composed of multiple UF₆ distribution pipes of 3–42-in. diameter.

Dates Operated: 1954–1985

Present Function: Inactive. When gaseous diffusion operations were stopped in 1985, the volatile UF₆ inventory was evacuated, and the tie lines were purged and isolated from the process system by closing valves in the interconnection buildings.

Life Cycle Operation: UF₆ tielines provided for the distribution of process gas between the enrichment cascades. The pipes were enclosed in thermally insulated housings and provided with hot air or steam heat and temperature control instrumentation to prevent condensation of UF₆ process inventory.

Waste Characteristics: A residual nonvolatile fluoride or oxyfluoride of uranium, and possibly technetium, plutonium, and neptunium, remain on the internal surfaces of tieline piping.

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Pipes

Comments:

References:

Date Prepared: March 1995

K-33/K-31 Tielines, Outdoor Process

Unit Name: K-101 Compressor Laboratory

Unit Number: R132

Project Status:

Unit Location: K-25 Site in the K-25 Building courtyard

Approximate Dimensions and Capacity: 6013 ft²

Dates Operated: 1954–present

Present Function: Small item storage and offices

Life Cycle Operation: K-101, a four-story concrete block building, was originally built to provide purified UF₆ to the K-25 enrichment cascade. However, the purification equipment was not operated. The building was later used as a temporary UF₆ feed system and later as a C-816 coolant recovery facility. K-101 was placed on standby in the mid-1950s. In the mid-1970s the building was taken over for office space in conjunction with a newly constructed adjacent centrifuge test facility. At that time, all of the process equipment and piping were removed, and the interior surface was heavily painted.

Waste Characteristics: Uranium

Release Data: No known releases. Uranium contamination in the building is contained behind heavy layers of paint.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building

Comments: This building is also known as K-101 Offices and Storage and the K-101 Centrifuge Research Building.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Date Prepared: February 1995

K-101 Compressor Laboratory

Unit Name: K-131 Maintenance Shop

Unit Number: R146

Project Status:

Unit Location: K-25 Site Process Plant Area North of K-27, adjacent to K-631

Approximate Dimensions and Capacity: 212 × 90 ft; 44,242 ft² total floor area; 32 ft high in five floors, including basement and penthouse

Dates Operated: 1946–1985

Present Function: Inactive. All floor drains have been sealed.

Life Cycle Operation: The K-131 facility was built to purify UF₆ feed enrichment. The building is a five-level, concrete cinder block structure with a poured concrete floor. By the time K-27 started operation in late 1945, it was unnecessary to purify the feed, so the purification equipment was not used. The K-131 Building provided the UF₆ feed vaporization function for the cascade from 1946 until another facility was built in K-33 in 1954. A uranium recovery wet chemistry process was installed and operated in K-131 in the early 1950s until this function was transferred to K-1420 in 1954.

Recovery of uranium from decontamination solutions in the basement of K-131 began as early as 1948. This recovery was of uranyl nitrate solutions from K-1410. Uranium solutions from the decontamination of equipment used in processing Hanford Reactor returns was also carried out in this building. The uranium recovery system continued in operations after startup of the K-1131 feed plant in 1952.

Maintenance offices and shops were later located in this area. A centrifuge for processing treated sludge from the K-1231 area was operated in the late 1970s and early 1980s.

Waste Characteristics: Chemical and radioactive contamination. During the last half of 1949, more than 16,000 gal of carbon tetrachloride used in the cleaning of cascade process motors was reclaimed by distillation in this building. Transuranics are a contaminant of concern from the decontamination of Hanford Reactor returns processing equipment.

Release Data: UF₆ is known to have been released within the building during feed vaporization activities. There is a contamination area of unknown origin directly north of K-131 outside the site security fence.

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building, soil, groundwater

Comments: There are classification concerns associated with this facility.

References:

Phase I Hazard Screening Analysis for the K-131 Feed Facility, HS/K-131/PK/25.1/R0, March 1992.

Date Prepared: March 1995

K-131 Maintenance Shop

Unit Name: K-300 Area Service Station

Unit Number: C093

Project Status:

Unit Location: K-25 Site Process Plant Area, in the southwest quadrant of the intersection of Avenue L and either 7th or 8th Street.

Approximate Dimensions and Capacity: Planned dimensions for an underground gasoline tank were 62-in. diameter by 10 ft, 6 in. long.

Dates Operated: Unknown; if the station were ever operated, it would have been in the period 1947–1949.

Present Function: Inactive; the gasoline station, if built, has been demolished.

Life Cycle Operation: A gasoline station to be built south of the K-300 area of the K-25 Process Building was designed in 1947 and is shown in the drawing below. However, a review of site plot plans, building listings, and aerial photographs fails to give evidence of a station ever having been built.

Waste Characteristics: Potential wastes from 1940s gasoline are tetraethyl lead, ethylene dibromide and dichloride, sulphur, methyl and ethyl alcohol, xylene, toluene, benzene, and alpha-methyl naphthalene.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This unit is not maintained as a discrete facility apart from general site surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments: This unit is not managed as a discrete unit apart from the general site area surveillance and maintenance.

References:

Plan and Details for Gasoline Pump and Tank, Carbide and Carbon Chemicals Company Drawing No. AW-P-4566-A, February 14, 1947.

Date Prepared: June 1995

K/PH92-4071

K-300 Area Service Station

Unit Name: K-300-C Coolant Storage Area

Unit Number:

Project Status:

Unit Location: Inside the K-25 Building "U" courtyard

Approximate Dimensions and Capacity: 400 ft²; 40 ft high

Dates Operated: 1945–1964

Present Function: One of the buildings has been demolished. With the exception of one coolant storage tank, all process pipe pumps and equipment have been removed. The remaining tank is open. One of the storage buildings is currently being used as a Radioactive Materials Storage Area (RMSA). The other building, which is deteriorated to near the point of collapse, is not being used for any purpose.

Life Cycle Operation: K-300-C was originally three buildings used as a coolant storage area. The two remaining buildings are of two-story wood frame construction with transite siding and roof.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Buildings

Comments: This facility encompasses units K-300-C-1, K-300-C-2, and K-300-C-3.

References:

Date Prepared: February 1995

K-300-C Coolant Storage Area

Unit Name: K-413 Product Withdrawal Facility

Unit Number: R164

Project Status:

Unit Location: K-25 Site Process Plant Area, north of Building K-29, east of K-1131

Approximate Dimensions and Capacity: 15,848 ft²

Dates Operated: 1946–85

Present Function: Shutdown

Life Cycle Operation: K-413, a two-story clay tile structure, housed a product withdrawal facility for the K-27 Building. After the K-27 product stream was connected to the K-25 Building in 1946, continuous operation of the K-413 facility was discontinued. Intermittent operation of the cold trap product withdrawal system continued until the K-25 and K-27 units were shut down in 1964. This equipment was removed, and three compression liquefaction withdrawal systems were installed and operated until operation of the Oak Ridge Gaseous Diffusion Plant cascade was discontinued in June 1985. In the 1950s the north end of K-413 was used as a production facility for fluorothene plastic. This part of the building later served as a maintenance facility.

Waste Characteristics: Chemical and radioactive contamination

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building

Comments: There are classification concerns associated with this facility. Several cylinders of UF₆ and hydrocarbon oil are known to have exploded in K-413. A total of five 2-in. lubricating oil pumps were the apparent cause. There is some possibility of contamination outside the building.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Date Prepared: February 1995

K-413 Product Withdrawal Facility

Unit Name: K-631 Contaminated Soil

Unit Number: C075

Project Status:

Unit Location: K-25 Site Process Plant Area, around a roof drain at the southwest corner of Building K-631

Approximate Dimensions and Capacity: Initial contamination area was a 4 ft² surface area. Later, a 50 × 50 ft area was surveyed.

Dates Operated: 1946–1985

Present Function: The 631 Building is inactive.

Life Cycle Operation: The K-631 Building was used to remove isotopically depleted gaseous UF₆ tails inventory from the enrichment cascade and convert the tails to a liquid by compression/liquefaction for transfer into transport cylinders. The facility was built in 1945 and served as a tails withdrawal facility from 1946 to 1964. Gas storage tanks were used from the 1970s until 1985 for storage and distribution of chlorine trifluoride and fluorine.

Gases inside the building were vented above the roof, causing partial deposition on the roof's surface. Rainwater runoff carries the surface contaminants to the building's roof drainage leaders with eventual discharge to the area's storm water drains. The drain leader immediately above the contaminated soil is separated from its scupper, allowing rainwater to cascade onto the ground rather than be conducted to the area's normal storm water collection channels.

Waste Characteristics: Uranium. On a routine radiological survey in 1992, elevated radiation counts were detected on a 2 × 2 ft ground area. The deeper the hole was dug, the higher the radiation counts, up to 90,000 dpm. A more comprehensive survey was done in February 1993 using Ludlum Model 2221 contamination survey instruments and Ludlum Model 19s low-level gamma survey instruments. This later survey turned up no significant contamination or radiation in the soil or storm drains.

Chemrad performed a walkover survey of the adjacent area west of K-631 using a sodium iodide/beta gamma device and found no radioactive contamination. This area is sloped to accept surface water runoff from K-631.

Release Data: The area is subject to infiltration by surface water.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater, surface water

Comments:

References:

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: February 1992

Date Revised: May 1995

K-631 Contaminated Soil

Unit Name: K-631 Process Tails

Unit Number: R166

Project Status:

Unit Location: K-25 Site Process Plant Area, at the northwest corner of K-27

Approximate Dimensions and Capacity: 315 × 110 ft; 39,040 ft² total floor space; 55 ft high

Dates Operated: 1946–1962

Present Function: Shutdown

Life Cycle Operation: The K-631 Building was built to remove isotopically depleted gaseous UF₆ tails inventory from the cascade and convert it to liquid UF₆ by compression/liquefaction for transfer into transport cylinders. The gas storage tanks were used from the 1970s until 1985 for storage and distribution of fluorine and chlorine trifluoride.

K-631 is a two-story building with a basement. The main floors and basement are poured concrete, and the walls are concrete block. The building contains two gas storage drum rooms with an interconnecting pipe gallery. The building contains UF₆ condensers, fluorocarbon heat exchangers, carbon and alumina sorbent traps, a recirculating lube oil system, UF₆ cylinder filling manifold, cranes, a control room, and personnel facilities.

Waste Characteristics: Chemical and radioactive contamination. Quantities of fluorinated hydrocarbon coolants are contained in the building.

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building interior

Comments: This unit is also known as K-631 Tails Withdrawal. There are classification concerns associated with this facility.

References:

Phase I Hazard Screening Analysis for the K-631 Process Tails Building, HS/K-631/PK/2T.2/R0, March 1992.

K-631 Building Characterization Report, XMTL 63 ESO M-#8 E00-001, January 19, 1988.

Date Prepared: February 1995

K-631 Process Tails

Unit Name: K-633 Test Loop Facility

Unit Number: R167

Project Status:

Unit Location: K-25 Site Process Plant Area, west of K-27 Process Building

Approximate Dimensions and Capacity: 169 × 80 ft, 19,021 ft² floor area

Dates Operated: 1954–1985

Present Function: Shutdown

Life Cycle Operation: K-633 was built to test and evaluate performance of gaseous diffusion process equipment under production conditions. Isotopically depleted gaseous UF₆ inventory for various process test loops was provided via the distribution header from the K-31 Building. Recirculating cooling water, R-114 process coolant, a recirculating compressor, motor lubrication systems, a compressor seal feed, and exhaust system were provided as auxiliary process support.

K-633 consists of four separate independent testing loops which have common auxiliary systems and utilities. These loops are located around the periphery of K-633 with the offices and main control room near the center. The No. 2 loop is located partly outside K-633. A small basement area under the southwest portion of loop No. 4 contains the lube oil storage tanks and supply pumps.

Waste Characteristics: Chemical and radioactive wastes

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building and equipment

Comments: Subunits of this facility are K-1040 Maintenance Shop and K-633-D Test Loop Storage. There are classification concerns associated with this unit.

References:

Phase 1 Hazard Screening Analysis for K-633, HS/K-633/PK/28.1/R0, March 1992.

Date Prepared: March 1995

K-633 Test Loop Facility

Unit Name: K-701 Boiler House–Fabrication Shop

Unit Number: R168a

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area, adjacent to K-702 Turbine Room and Discharge

Approximate Dimensions and Capacity: 192 × 147 ft; 28,880 ft² floor area; 140 ft high

Dates Operated: 1943–1962

Present Function: Inactive

Life Cycle Operation: The steam boilers for the Powerhouse Area were located in the K-701 Building, a steel frame structure with brick exterior. Initial operation to supply power to the K-25 Building process equipment started in 1944 and continued to 1962 when the power generating facilities were shut down. During operation, the powerhouse burned 5.97 tons of coal and 3.78 million gal of fuel oil. After shutdown, the equipment was removed from K-701, and the building was later used as a maintenance fabrication shop.

Waste Characteristics: No known contaminants

Release Data: Not applicable

Site Status: This facility is scheduled for demolition in 1995 as part of the Powerhouse Area Project.

Media of Concern: None

Comments:

References:

Phase 1 Hazard Screening Analysis for K-701, HS/K-701/PK/29.9/R0, March 1992.

Date Prepared: February 1995

K-701 Boiler House-Fabrication Shop

Unit Name: K-702 Turbine Room and Discharge

Unit Number: Unit Number: R168b

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area, adjacent to K-701 Boiler House and Fabrication Shop

Approximate Dimensions and Capacity: 600 × 100 ft; 96,126 ft² floor area

Dates Operated: 1944–1962

Present Function: Inactive; portions of the brick have fallen off corners. The roof leaks severely and lower portions of the facility are flooded.

Life Cycle Operation: The K-702 Building, a steel frame structure with brick exterior, formerly contained the steam turbines and generators of the K-25 Power Plant. The facility was built to supply power to the K-25 Building process equipment. After power generating facilities were shut down in 1962, the equipment was removed from the building. Several massive concrete pedestals formerly supported turbines and generators. Some of these pedestals were more recently used to shield high-pressure vessel test experiments.

Waste Characteristics: No known hazardous wastes

Release Data: Not applicable

Site Status: This facility is scheduled for demolition in 1995 as part of the Powerhouse Area Project

Media of Concern: None

Comments: K-740, a 200 ft² abandoned paint storage shed, is a sub-unit of this facility.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Date Prepared: February 1995

K-702 Turbine Room and Discharge

Unit Name: K-703 Fabrication Shop and Biophysical Laboratory

Unit Number: R168c

Project Status: Powerhouse Area Project

Unit Location: K-25 Site Powerhouse Area, adjacent to buildings K-701 and K-702

Approximate Dimensions and Capacity: 21,285 ft². This building is a three-story structure with an additional two-story concrete structure extending from the roof at the southwest corner.

Dates Operated: 1944–1980s

Present Function: Inactive

Life Cycle Operation: The K-703 Building, a concrete frame structure with brick exterior, provided powerhouse offices and laboratories when built in 1944. During the late 1960s and 1970s, some of the abandoned offices and laboratory areas were used by the Molecular Anatomy Project (MAN) of the Oak Ridge National Laboratory (ORNL) Biology Division. According to workers at the unit, there were no releases of hazardous substances and no releases of radioactive contamination to the facility structure or drainage system. The equipment was distributed to various sections of the Biology Division at ORNL and the Oak Ridge Y-12 Plant. The equipment was totally cleaned and decontaminated. The offices were later used by Maintenance and Engineering during the 1980s.

Waste Characteristics: Uranium

Release Data: Viral research was performed in this building in the 1960s. Virus samples were kept under strict controls in a glove box. According to a report of this operation, "Spilled materials in the glove box, dialysates, wash solutions, and waste from the steam sterilizer are dumped through valved ports in the floor of the glove box to a drain sterilizer where wastes are autoclaved before being run into the sewage lines."

Site Status: This facility is scheduled for demolition in 1995 as part of the Powerhouse Area Project.

Media of Concern: Building interior

Comments: K-703 is also known as the MAN Building.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

N. Cho et al., *Problems in Biocontainment in the Development of Zonal Centrifuges and Ancillary Systems for Tissue and Fractionation and Analysis*, National Cancer Institute Monograph, June 1966.

Date Prepared: June 1995

K-703 Fabrication Shop and Biophysical Laboratory

Unit Name: K-705-B Crib House

Unit Number: R168d

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area, on the bank of the Clinch River

Approximate Dimensions and Capacity: 1814 ft²

Dates Operated: 1944–1962

Present Function: Inactive

Life Cycle Operation: K-705-B was built in 1944. Water needed for powerhouse boilers, turbine condensers, etc., was obtained from the Clinch River via a water intake traveling screen filter house, K-705-B. This water flowed through an underground flume to the water pumphouse, K-706, where it was then pumped to the needed equipment. The equipment in K-705-B was shut down in 1962.

K-705-B consists of a concrete structure below grade that channels water. The superstructure and roof are concrete and wood frame. The exterior walls are asbestos/cement shingles. The interior contains idle traveling screen equipment.

Waste Characteristics: Asbestos

Release Data: No known releases

Site Status: This facility is scheduled for demolition in 1995 as part of the Powerhouse Area Project.

Media of Concern: None

Comments: The K-705-A Trash Barrier is a subunit of this facility.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Date Prepared: June 1995

K-705-B Crib House

Unit Name: K-706 Pump House

Unit Number: R168e

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area between K-707 and the Clinch River

Approximate Dimensions and Capacity: 4464 ft²

Dates Operated: 1944–1962

Present Function: Inactive. The below-grade structure is flooded to a depth of approximately 10 ft.

Life Cycle Operation: K-706 contains circulating cooling water pumps for the powerhouse. Water needed for the boilers, turbine condensers, etc., was obtained from the Clinch River via K-705-B. This water flowed through the underground flume to the pumphouse, where it was pumped to the needed equipment. Ash sluice water pumps supplied high-pressure water to sluice the ash from the boiler discharge to the ash disposal field alongside the discharge water plume just prior to exiting into Poplar Creek.

K-706 consists of a concrete below-grade substructure that extends approximately 45 ft past the south wall of the superstructure. This extension is covered by concrete slab at grade. The superstructure is a concrete frame with concrete roof. The superstructure has corrugated asbestos/cement siding.

Waste Characteristics: Asbestos

Release Data: No known releases

Site Status: This facility is scheduled for demolition in 1995 as part of the Powerhouse Area Project.

Media of Concern: Building materials

Comments:

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities,
K/DD-45, December 1992.

Date Prepared: February 1995

K-706 Pump House

Unit Name: K-707 Auxiliary Switch House

Unit Number: R168f

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area, across South Ferguson Road from K-701

Approximate Dimensions and Capacity: 6540 ft²

Dates Operated: 1944–1962

Present Function: Inactive; a sump pump keeps the basement from flooding. A continuous water inflow occurs in the northwest corner of the basement where a cable duct bank enters.

Life Cycle Operation: The K-707 Auxiliary Switch House supplied power to the auxiliary pieces of equipment within the power station. The auxiliary power used to drive the many fans, coal pulverizers, coal conveyor belts, water pumps, intake screens, etc., was obtained from the transformers and switch gear located in K-707. Switchgear, abandoned in the 1960s, remains in the building. Including the basement, K-707 is a four-level concrete frame structure with brick exterior walls.

Waste Characteristics: No known contaminants

Release Data: Not applicable

Site Status: This facility is scheduled for demolition in 1995 as part of the Powerhouse Area Project.

Media of Concern: None

Comments:

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Date Prepared: May 1995

K-707 Auxiliary Switch House

Unit Name: K-709 Switchyard

Unit Number: R075a

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area, west of Hwy. 58, just off Powerhouse Road

Approximate Dimensions and Capacity: Approximately 250 × 400 ft

Dates Operated: 1944 to 1962

Present Function: Inactive; K-709-A Oil Filtering Facility, K-709-B Tank, K-709-C Valve House, and switchyard towers have been demolished.

Life Cycle Operation: This switchyard was built to serve the K-700 Powerhouse Area and K-25 cascade. It was stripped of most of its equipment in 1978. Through 1994, the switchyard was used as a storage area by the Department of Justice for confiscated vehicles and as storage for a variety of new and used materials.

Waste Characteristics: Oil used in the original equipment was free of PCBs. Any PCB content resulted from cross-contamination. Asbestos was found in pipes stored on the switchyard in 1994.

Release Data: A transformer failure, which likely released PCB oil, is recorded for July 1950 in the cooling towers RCRA facility investigation (RFI) report (K/HS-180). However, an operational record included in an appendix to that same document shows that the transformer explosion more likely occurred in equipment in the K-762 Switchyard. There are legacy PCB stains on the northeast corner of the K-709 yard, and motor oil stains are visible from vehicle storage.

Site Status: Structures on this unit have been demolished as part of the Powerhouse Area Project. This unit is also within the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and surface water

Comments: Subunits of this facility were the K-709-A Oil Filtering Facility, K-709-B Transformer Oil Storage Tank and K-709-C Sprinkler Valve House. This switchyard is also known as the K-25 Substation.

References:

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

RCRA Facility Investigation Plan, K-792, K-709, K-762, and K-732 Switchyards, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-180, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Date Prepared: April 1987

Date Revised: May 1995

K-709 Switchyard (ca. 1945)

K-709 Switchyard

Unit Name: K-710 Sludge Beds and Imhoff Tanks

Unit Number: R076

Project Status:

Unit Location: Southwest corner of the K-25 Powerhouse Area

Approximate Dimensions and Capacity: 20,000 gal/day normal; 60,000 gal/day maximum

Dates Operated: 1943–1978

Present Function: The tanks and sludge beds are not in service.

Life Cycle Operation: The original Powerhouse area sewage treatment system contained the K-710-A Lift Station, K-710-B, -F, and -G Sludge Beds, K-710-C Imhoff Tank and a chlorination system. In 1974–75 the system was replaced with the current system downstream from the K-710-A Lift Station. The later treatment unit contains a sludge holding zone, aeration zone, two settling zones, and two new sludge beds. The later unit received effluent from the original station and discharges through a chlorination contact tank into the Clinch River.

Waste Characteristics: Sewage. A chance exists for trace quantities of radioactive contaminants to have reached the tanks from the plant laundry or various changehouse facilities. Both the north and south Imhoff tanks were tested for PCBs in 1984, and both came up below detection limits of 1 ppb.

Release Data: There are no known releases other than treated sewage.

Site Status: This unit is within the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Sludge

Comments:

References:

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Letter from L. W. Long, Environmental Coordinator, ORGDP, to B. J. Davis, DOE-ORO, March 6, 1985.

Date Prepared: April 1988

Date Revised: May 1995

K/PH91-3158

K-710 Sludge Beds and Imhoff Tanks

K/PH91-3147

K-710 Sludge Beds and Imhoff Tanks

Unit Name: K-712 Fairchild Switch House Substation

Unit Number: R168g

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area between Railroad Avenue and South Ferguson Road

Approximate Dimensions and Capacity: 50 × 30 ft

Dates Operated: 1944–1994

Present Function: Demolished

Life Cycle Operation: K-712 was originally an electrical substation and distribution point for the S-50 Fercleve Thermal Diffusion Plant and was designated as Building F-04. Three 480-volt breakers supplied power to K-722, K-723 and K-724.

Waste Characteristics: PCBs are a possible contaminant of concern.

Release Data: No known releases

Site Status: This facility was demolished as part of the Powerhouse Area Project.

Media of Concern: None

Comments:

References:

Details, Underground Ducts and Manholes, Project S-50 Yard, Drawing No. KF-700-AN-89-AC, Rev. 2, Kellex Corporation, August 4, 1945.

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: March 1995

K-712 Fairchild Switch House Substation

Unit Name: K-715 Water Valve House

Unit Number:

Project Status: Powerhouse Area Project

Unit Location: K-25 Site, southwest of the main Powerhouse between River Road and the Clinch River

Approximate Dimensions and Capacity: 700 ft²

Dates Operated: 1946–62

Present Function: Inactive

Life Cycle Operation: This facility was part of the water system used for boilers, turbine condensers, etc., used for the K-25 Site Powerhouse.

Waste Characteristics: No known contaminants

Release Data: No known releases

Site Status: This unit is scheduled for demolition as part of the Powerhouse Project.

Media of Concern: None

Comments: This unit is also known as the K-715 Water Treatment System.

References:

Date Prepared: June 1995

K-715 Water Valve House

Unit Name: K-720 Fly Ash Pile

Unit Number: R045

Project Status: Clean Water Act

Unit Location: K-25 Site at east of the Powerhouse Area

Approximate Dimensions and Capacity: Approximately 9 acres

Dates Operated: 1944-62

Present Function: The area has been covered with lime, capped, and planted with trees.

Life Cycle Operation: A total of 5.97 million tons of coal were burned in the K-701 Powerhouse during its operation. The K-720 Fly Ash Pile contains bottom ash, slag, and coal fines from this powerhouse operation. Remnants of an old coal pile also exist southwest of the ash pile. Sewage sludge has been sprayed on the ash pile to raise the pH of runoff. During 1993, application of lime to control low pH in nearby surface water began. Placement of a soil covering began in 1994.

Waste Characteristics: Fly-ash from a coal-fired steam plant

Release Data: Runoff and leachate resulted in low pH in surrounding surface water. Data collected at SD 992 during a 1987 storm drain characterization study indicated high levels of aluminum, arsenic, iron sulfate and dissolved and suspended solids in the storm drain effluent.

Site Status: This unit is within the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: None

Comments:

References:

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

RCRA Facility Investigation Plan, K-720 Fly Ash Pile, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-150, Martin Marietta Energy Systems, Inc., May 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Annual Summary Report on the Surveillance and Maintenance Program for Remedial Action Inactive Waste Sites at the Oak Ridge K-25 Site, Fiscal Year 1993, K/ER-110, K-25 Environmental Restoration Program, Martin Marietta Energy Systems, Inc., November 1993.

Annual Summary Report on the Surveillance and Maintenance Program for Remedial Action Inactive Waste Sites at the Oak Ridge K-25 Site, Fiscal Year 1994, K/ER-182, K-25 Environmental Restoration Program, Martin Marietta Energy Systems, Inc., November 15, 1994.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K/PH948240

K-720 Fly Ash Pile

Unit Name: K-722 Area Landfarming

Unit Number: C111

Project Status:

Unit Location: K-25 Site Fercleve/Powerhouse Area in the immediate vicinity of Building K-722

Approximate Dimensions and Capacity: The exact boundaries of the landfarming operation are unknown.

Dates Operated: 1982

Present Function: Paved road

Life Cycle Operation: Around 1000 gal of oil was landfarmed in 1982 for dust suppression on roads in the immediate vicinity of the K-722 Building. The roads were later paved.

Waste Characteristics: Mineral oil

Release Data: The oil was rejected if it contained uranium contamination, more than 1% chlorinated hydrocarbons or 5 ppm or more PCB.

Site Status: This unit is not maintained as a discrete facility for the purposes of site surveillance and maintenance.

Media of Concern: Surface soil

Comments:

References:

Date Prepared: August 1994

Date Revised: June 1995

K-722 Area Landfarming

Unit Name: K-724 Storage Warehouse

Unit Number: R169

Project Status:

Unit Location: K-25 Site Fercleve/Powerhouse Area across South Ferguson Road from K-722

Approximate Dimensions and Capacity: 8280 ft²

Dates Operated: late 1940s to present

Present Function: Surplus storage

Life Cycle Operation: The two portions of the current K-724 Building were originally additions to the F-08 Laboratory 1, a support facility for the S-50 Fercleve Thermal Diffusion plant, operated 1944-45. By 1957 the original F-08 laboratory portion of the building had been demolished.

In a 1953 survey K-724, here referred to as F-08, was found to have beryllium contamination on equipment in rooms 12, 16, and 22. Trace amounts of radioactivity were found in rooms 11, 12, and 22. The report states that rooms 24, 24-A, 24-B and 240 "have been used for various experiments involving considerable quantities of radioactive material, and they are considered quite heavily contaminated." The report goes on to say that "the principle contaminant is probably a hydrocarbon, therefore a suitable solvent may aid in decontamination." It is unclear whether these contaminated portions of the building were located within the original F-08 laboratory, which was later demolished.

In 1975, Building 724 was surveyed for Be contamination, and the highest concentration was found to be 0.7 micrograms per 12 in.². The letter states that old hood ducts, which were sealed, were known to contain the greatest quantities of Be contamination.

A portion of the building is currently being used as a surplus storage area. The building is a one-story masonry structure with a corrugated cement/asbestos roof.

Waste Characteristics: Beryllium and radioactivity

Release Data: No known releases

Site Status: This is an active facility and is part of the Decontamination and Decommissioning Program.

Media of Concern: Building interior and roof

Comments: This unit is also known as K-724 Property Sales.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Robert E. Baker, *S-50 Area, Oak Ridge, Tennessee, Contamination Survey for Be and Radioactivity*, Aircraft Nuclear Propulsion Project, General Electric Company, Evendale, Ohio, March 13, 1953.

Internal correspondence from H. F. Higdon to M. R. Bradshaw, Union Carbide Nuclear Division, Re: Beryllium Contamination, Buildings K-724 and K-725, November 26, 1975.

Date Prepared: May 1995

K-724 Storage Warehouse

Unit Name: K-725 Beryllium Building

Unit Number: C004

Project Status:

Unit Location: K-25 Site Fercleve/Powerhouse Area, within the K-770 scrap metal yard

Approximate Dimensions and Capacity: 21,614 ft²; original area 13,440 ft² (160 × 84 ft)

Dates Operated: 1944–1952

Present Function: The building is abandoned, in a very poor state of repair, and overgrown with weeds and brush. The area surrounding the building has been cordoned off with radiological hazard rope.

Life Cycle Operation: The building was originally F-10 Machine Shop, a part of the Fercleve S-50 Thermal Diffusion Plant, which operated in 1944–45. F-10 contained a machine shop, pipe and welding shop, auto shop, parts room, tool crib, and offices. The auto repair shop contained a grease pit. All toilet facilities, drinking fountains, and floor drains discharged to sanitary sewers.

In the late 1940s and early 1950s, the building was used for beryllium machining and experimentation as part of the Aircraft Nuclear Propulsion Project. In 1953, a radiological and beryllium contamination survey was done on F-10. The 1953 report states that, "A considerable amount of contamination was found on most equipment and in the building" and that rooms 10, 11, 14, 17, 19–26, and 38 are "quite heavily contaminated." Although it was considered minor in comparison to the problem of Be contamination, the survey also discovered radioactive contamination in the building.

An effort was made in the 1950s or early 1960s to decontaminate the building interior. Residue of beryllium fines and powders were cleaned up, floor tiles removed, walls cleaned, and fixtures removed and decontaminated. However, when levels of Be contamination were still found to be too high for ordinary operations within the building, it was again closed.

During the 1950s or early 1960s the building was used for storage of Powerhouse area switchgear. Before being released, the equipment was scanned and decontaminated if necessary.

In the early 1970s, a Union Carbide chemical operations crew attempted to decontaminate the building by scrubbing walls, vacuum cleaning, and removing floor tiles and light fixtures. Ventilation and exhaust ducts were sealed, and no effort was made to decontaminate their internal surfaces. When the decontamination effort proved unacceptable, the building was closed.

Waste Characteristics: Beryllium, uranium, mercury, asbestos

Release Data: The 1953 report states that "the ground between F-10 and the railroad tracks for approximately 100 ft around the doors leading into rooms 23 and 24 is known to be very highly contaminated with beryllium powders, chips, oxides, carbides, etc." The report states that "considerable" steam cleaning of Be and radioactively contaminated equipment was done in front of F-10 near the steam outlet where the railroad tracks cross the road, and that a 20 by 40 ft area is suspected of contamination at "fairly high levels." A radioactive waste storage site against a fence approximately 30 ft from room 38 is also reported.

Two small (approximately 6 fl oz) mercury air traps used in Room 12 occasionally broke and spilled mercury onto the floor, where it was swept down the floor drain.

Beryllium may also still exist in the dust collection system.

Site Status: This unit is currently within the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, building

Comments: At some time during its operation a second concrete pad was placed over the original floor, which is thought to be radiologically contaminated.

References:

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

RCRA Facility Investigation Plan, K-725 Building, ORGDP, Oak Ridge, Tennessee, K/HS-148, Martin Marietta Energy Systems, Inc., June 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Project S-50 Machine Shop Floor Plan and Details, Drawing Contract No. 1032, Sheet No. E-100, H. K. Ferguson Co., Engineers, November 11, 1944.

Project S-50 Machine Shop Plumbing—Soil and Waste Sites, Drawing Contract No. 1032, Sheet No. E-200, H. K. Ferguson Co., Engineers, undated.

Project S-50 Process Building Convector Pipe Assembly, Drawing Contract W-7409, Sheet No. A-82001, Fercleve Corporation, June 22, 1945.

Robert E. Baker, *S-50 Area, Oak Ridge, Tennessee, Contamination Survey for Be and Radioactivity, Aircraft Nuclear Propulsion Project, General Electric Company, Evendale, Ohio, March 13, 1953.*

Internal correspondence from H. F. Higdon to M. R. Bradshaw, Union Carbide Nuclear Division, Re: Beryllium Contamination, Buildings K-724 and K-725, November 26, 1975.

Phase I Hazard Screening Analysis for Powerhouse Areas Facilities Buildings K-711, K-725, K-725-A, K-726, K-770 Scrap Crush Facility, and Warehouse Adjacent to K-725, HS/K-725WM/PK, Draft 1, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 6, 1992.

Date Prepared: April 1987

Date Revised: June 1995

K-725 Beryllium Building

Unit Name: K-726 PCB Storage Facility

Unit Number: R040

Project Status:

Unit Location: K-25 Site Fercleve/Powerhouse Area within the K-770 Scrap Metal Yard

Approximate Dimensions and Capacity: 75 ft × 50 ft. The facility held approximately five hundred 55-gal drums.

Dates Operated: Built 1944; Site was operated as polychlorinated biphenyl (PCB) storage area 1978–1994.

Present Function: Inactive. PCB wastes have been removed, and a cleanup of the floor area is planned.

Life Cycle Operation: F-19 was built in 1944 as Boiler House No. 2 for the S-50 Thermal Diffusion Plant. The boiler house burned oil from the nearby F-22 Tank Farm. After Fercleve shut down operations in 1945, the building was renamed K-1088 and, later, K-726 by Carbide Corp. Beginning in 1978 the building was used for the storage of PCB liquids and solids. The storage facility was diked with a sealed concrete floor. The unit was inspected weekly.

Waste Characteristics: PCB wastes which include capacitors, kerosene, soil, and ballasts. All material stored at this facility was considered radioactively contaminated.

Release Data: No known releases

Site Status: This unit is under the purview of the Waste Management Division

Media of Concern: None

Comments:

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-770 Scrap Metal Yard and Contaminated Debris, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-137, Martin Marietta Energy Systems, Inc., June 1988.

Phase I Hazard Screening Analysis for Powerhouse Areas Facilities Buildings K-711, K-725, K-725-A, K-726, K-770 Scrap Crush Facility, and Warehouse Adjacent to K-725, HS/K-725WM/PK, Draft 1, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 6, 1992.

Date Prepared: April 1987

Date Revised: June 1995

K-726 PCB Storage Facility

Unit Name: K-731 Switch House & K-732 Switchyard

Unit Number: R075b

Project Status:

Unit Location: K-25 Site Process Plant Area, west of the K-27/29 buildings

Approximate Dimensions and Capacity: 400 × 500 ft

Dates Operated: 1945 to present

Present Function: Transfer of electrical power to the K-25 Plant Site

Life Cycle Operation: K-732 Switchyard was originally built to serve the K-27/29 cascades and now serves as the primary power center for the K-25 Plant Site. A series of French drains were installed immediately under the gravel beds in 1975. In 1980–81 oil skimmers were installed for run-off water.

Waste Characteristics: PCBs are the only known contaminants from this unit.

Release Data: In 1982 equipment failure at K-732 Switchyard resulted in the release of approximately 2900 gallons of PCB-containing oil. Several days later, an oily film was observed on Poplar Creek. The film was traced to a valve sump pump which drained to Poplar Creek via a storm drain to the west of the switch house. The drain was rerouted to a skimmer pit.

Site Status: This switchyard is active.

Media of Concern: Surface water, soil, and sludge

Comments: This unit is also known as the K-27 Substation.

References:

RCRA Facility Investigation Plan, K-792, K-709, K-762, and K-732 Switchyards, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-180, December 1988.

Date Prepared: April 1988

Date Revised: May 1995

K-731 Switch House & K-732 Switchyard

Unit Name: K-734 Storage/Breaker House

Unit Number: R169h

Project Status: Powerhouse Area Project

Unit Location: K-25 Site Fercleve/Powerhouse Area, southwest of K-724 along South Ferguson Road

Approximate Dimensions and Capacity: 178 × 38 ft; two stories

Dates Operated: 1944–present

Present Function: Storage of mortar and sand

Life Cycle Operation: This building, originally designated F-02, was built in 1944 as a pump house for the Fercleve S-50 Thermal Diffusion Plant. Pumps took raw water from the Clinch River through the K-705-B Crib House and delivered it to the F-02 sump. The makeup water to the process was supplied by two pumps with capacity of 15,000 gpm each. Five pumps were installed, giving a total capacity of 75,000 gpm. The building has first floor concrete walls and second floor transite siding.

Waste Characteristics: Asbestos is a possible contaminant in demolition.

Release Data: Not applicable

Site Status: This building is being demolished as part of the Powerhouse Demolition Project.

Media of Concern: Building siding

Comments:

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

K-734 Storage/Breaker House

Unit Name: K-735 Storage Building

Unit Number: R171

Project Status: Powerhouse Area Project

Unit Location: K-25 Fercleve/Powerhouse Area, west of K-701 between K-712 and the railroad tracks

Approximate Dimensions and Capacity: 4370 ft²

Dates Operated: 1944 to 1994

Present Function: Demolished

Life Cycle Operation: This building was originally designated F-03 and served as the water treatment plant for the Fercleve S-50 Thermal Diffusion Plant, 1944-45. The structure was equipped with alum, clay, lime, and phosphate feeders and may have had the capability for adding sulfuric acid to treated water. The raw water supply to the F-03 Treatment Plant came from wells and was given a coagulation and settling treatment. Treated water was used for freeze-off water for the F-01 process building and for gland water for operating desuperheater pumps.

Waste Characteristics: None

Release Data: Not applicable

Site Status: This facility was demolished as part of the Powerhouse Area Project.

Media of Concern: None

Comments: An ancillary facility, K-735-A Storage Building, has also been demolished.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Project S-50 Sketch Showing Proposed Location of Water Treatment Plant, Drawing Contract No. 1032, Drawing No. X-10, H. K. Ferguson Co., Engineers, September 6, 1944.

Project S-50 Water Treatment Plant Elevations, Drawing Contract No. 1032, Sheet No. D-102, H. K. Ferguson Co., Engineers, September 12, 1944.

Project S-50 Water Treatment Plant Concrete Details, Drawing Contract No. 1032, Sheet No. D-2, H. K. Ferguson Co., Engineers, September 22, 1944.

Project S-50 Water Treatment Plant Pump and Tank Foundation Details, Drawing Contract No. 1032, Sheet No. D-3, H. K. Ferguson Co., Engineers, September 15, 1944.

S-50 Project Water Treatment Plant Power and Lighting, Drawing Contract No. 1032, Sheet No. 401, H. K. Ferguson Co., Engineers, September 22, 1944.

Steam Line to Pump House and Water Treatment Plant, Drawing Contract No. 1032, Sketch 24, H. K. Ferguson Co., Engineers, January 17, 1945.

Water Layout, Drawing No. W-7409, Eng. 100, Sheet No. 4-100, Fercleve Corp., September 14, 1945.

Date Prepared: March 1995

K-735 Storage Building

Unit Name: K-736 Storage Building

Unit Number:

Project Status:

Unit Location: K-25 Powerhouse Area, adjacent to the K-725 Beryllium Building

Approximate Dimensions and Capacity: 100 × 60 × 15 ft high

Dates Operated: 1986–present

Present Function: Inactive

Life Cycle Operation: K-736 is a steel-frame building with a corrugated metal shell with a concrete slab, on-grade floor. The building was used to support metal recycling and decontamination activities at the K-770 Scrap Metal Yard in 1988. More recently, the building contained the ⁹⁹Tc decontamination demonstration project. The building was used briefly in 1994 to house the temporary negative pressure decontamination demonstrations.

Waste Characteristics: Radionuclides

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building surfaces

Comments:

References:

General Background Information on K-736 Storage Building, K/EM-98, Pt. 1, Environmental Management Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 6, 1995.

Date Prepared: June 1995

K-736 Storage Building

Unit Name: K-738 Chlorinator House

Unit Number: R169i

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area, between Railroad Avenue and River Road

Approximate Dimensions and Capacity: 15 × 15 ft; there was an attached, sheltered storage area of equal dimensions.

Dates Operated: 1944–94

Present Function: Demolished

Life Cycle Operation: K-738 was originally built as a chlorinator house to support powerhouse operations.

Waste Characteristics: None

Release Data: Not applicable

Site Status: This facility was demolished as part of the Powerhouse Area Project.

Media of Concern: None

Comments:

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

K-738 Chlorinator House

Unit Name: K-762 Switchyard and K-761 Switch House

Unit Number: R075c

Project Status:

Unit Location: K-25 Site Process Plant Area, just west of the K-31 Building

Approximate Dimensions and Capacity: 130,380 ft²

Dates Operated: 1952–85

Present Function: Switchyard is inactive. The 161-kV feeds have been disconnected, and transformers have either been drained or removed from the yard. The switchyard is partially fenced.

Life Cycle Operation: The unit transferred electrical power from TVA transmission lines to the K-31 cascade operation. At construction, a series of French drains were installed immediately below the switchyard's gravel bed. An oil skimmer for runoff water was installed in 1980–81.

Waste Characteristics: PCBs (polychlorinated biphenyls) are the only known contaminants from this unit.

Release Data: In 1951, two related transformer explosions and subsequent fire resulted in the release of PCBs.

Site Status: This switchyard is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program. The switchyard superstructure is also part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Surface water, soil.

Comments: This unit is also known as the K-31 Substation. Valve vaults 1 and 2 are included in the Decontamination and Decommissioning portion of this unit.

References:

RCRA Facility Investigation Plan, K-792, K-709, K-762, and K-732 Switchyards, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-180, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Historical Investigation Report Site 28A, K-794 Stained Soil, K-33 Switchyard.

Date Prepared: April 1988

Date Revised: February 1995

K-762 Switchyard and K-761 Switch House

Unit Name: K-766 CRBR Sampling Storage Shed

Unit Number: R169j

Project Status:

Unit Location: East of the K-25 Powerhouse Area

Approximate Dimensions and Capacity: 20 × 15 ft

Dates Operated: Unknown

Present Function: Abandoned. B-25 boxes are being stored around the building.

Life Cycle Operation: K-766 was the powerhouse slag disposal area, 1944–62, and the building later designated K-766, a one-story wood frame structure, was probably used in relation to this operation. Later, the building was used as a storage area for the Clinch River Breeder Reactor Project. The fenced area immediately surrounding the building contains several B-25 storage containers.

Waste Characteristics: No known hazardous wastes

Release Data: Not applicable

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: None

Comments:

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

K-766 CRBR Sampling Storage Shed

Unit Name: K-770 Scrap Metal Yard and Contaminated Debris

Unit Number: R008 and C009

Project Status:

Unit Location: K-25 Site Powerhouse Area on the east bank of the Clinch River, approximately 2000 ft upstream of the confluence of Poplar Creek

Approximate Dimensions and Capacity: Thirty acres. Approximately 40,000 tons of metal are presently stored at site.

Dates Operated: 1960s to the present as a scrap yard; 1940s as oil storage area.

Present Function: The scrap metal yard is currently inactive. A separate area is used by the Waste Management Division for radiologically contaminated scrap metal. A radiation survey conducted in Fiscal Year (FY) 1994 identified areas of high radiological contamination inside the previously identified radiation control area. These high-contamination areas were roped off and posted.

Life Cycle Operation: Beginning in 1944–45, this area was the site of a tank farm, designated F-22, used for storing fuel oil. The oil was stored in 13 tanks, each with a 470,000 gal capacity, adjacent to the Clinch River. The tanks, containing Bunker C oil (fuel oil grade No. 3), were individually earthen diked, and a second dike was built around each of the three groupings of tanks. Fuel oil usage at the powerhouse extended from May 1944 through the end of 1953, during which time 1.63 million gal of No. 3 fuel oil and 1.85 million gal of Bunker C oil were burned. The tanks remained in place through 1954.

Scrap metal storage began in the 1960s, and waste management tracking operations began at the unit in 1977. From 1984 to 1986, a segregation of the metals was performed under contract by the Quadrex Corporation. The materials were separated by metal type and then reduced in volume by shearing. Categories of metal were asbestos-contaminated, rubbish, cast aluminum, aluminum blades, items with radiological "hot spots," segregated metal, and Class 004 (too large to shear). A RCRA self-assessment was performed on this unit in FY 1994, and all readily identified and accessible RCRA-regulated materials were removed.

Waste Characteristics: Scrap material consists of various types of metals from equipment used at the K-25 Site. The scrap metal is contaminated with radioactive materials, primarily uranium. These units also contain approximately 20,000 ft³ of asbestos-contaminated metal, primarily pipe. PCBs (polychlorinated biphenyls) and mercury are also suspected contaminants. Radiochemical contamination consists almost entirely of beta activity and is concentrated mainly in the northern part of the yard. Mean gross activity exceeding 15 pCi/L was determined for one well, UNW-13 (18 pCi/L). All of the isotopes identified are beta emitters, ⁹⁹Tc being the dominant species. Mean activities for wells are as follows: ⁹⁹Tc, 822 pCi/L; ²³⁴Th, 22 pCi/L; total Sr, 3 pCi/L.

Release Data: Samples collected in a storm drain in the storage area revealed detectable concentrations of radioactive constituents. Soil samples collected in the past also revealed detectable concentrations of radioactive constituents.

An aerial photograph from 1954 shows a large quantity of fuel oil filling the earthen dike at tank F-22-7.

Site Status: The K-770 Contaminated Debris is a pile of miscellaneous metals that were sorted during the cleanup of the K-770 Scrap Metal Yard. The Contaminated Debris and the Scrap Metal Yard are considered as one unit for a planned remedial investigation. A soil sampling program, as described in the RCRA facilities investigation (RFI) plan, referenced below was conducted during the summer of 1990. These units are under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater, and surface water.

Comments: These units were listed on separate data sheets in the previous version of this document. The K-726 PCB Storage Facility is located within the scrap metal yard.

References:

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-770 Scrap Metal Yard and Contaminated Debris, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-136, Martin Marietta Energy Systems, Inc., June 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Aerial Photo 54-616, U.S. Department of Energy Oak Ridge Operations, Oak Ridge, Tennessee, 1954.

Date Prepared: April 1987

Date Revised: May 1995

K-770 Scrap Metal Yard and Contaminated Debris

Unit Name: K-792 Switchyard/K-791 Switch Houses

Unit Number: R075d

Project Status:

Unit Location: K-25 Site Process Plant Area, west of the K-33 Building

Approximate Dimensions and Capacity: 1000 × 300 ft.

Dates Operated: 1954–85

Present Function: The switchyard is inactive. There is one pole-mounted PCB transformer stored in the back of the yard, and surplus electrical equipment is kept in the yard. PCB signs have been posted on the gate. All other PCB oil-filled equipment has been drained. Radiologically contaminated material is stored at this facility in B-25 boxes. The switchyard area is fenced.

Life Cycle Operation: The unit transferred electrical power from local facilities to the K-33 cascade operations. A series of French drains were installed at construction immediately under the switchyard's gravel bed. An oil skimmer for runoff water was installed in 1980–81.

Waste Characteristics: PCBs are the only known contaminants from this unit.

Release Data: Oil stains have been found on soil outside the K-794 Oil Pump/Oil Storage Building inside the switchyard.

Site Status: The switchyard is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program. The switchyard superstructure is also part of the Decontamination and Decommissioning Program.

Media of Concern: Surface water, soil, and sludge

Comments: This site is also known as the K-33 Substation or K-33 Switchyard. Valve vaults 1, 2, 3, and 4 are part of the Decontamination and Decommissioning portion of this facility. K-791 Switch Houses include K-791, K-791-N and K-791-S.

References:

General Background Information on K-791-B K-33 Switchyard Electrical Shop, K/EM-98, Pt. 2, Environmental Management Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 6, 1995.

General Background Information on K-796-A Electrical Equipment Storage/Shop, K/EM-98, Pt. 3, Environmental Management Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 6, 1995.

RCRA Facility Investigation Plan, K-792, K-709, K-762, and K-732 Switchyards, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-180, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Date Prepared: April 1988

Date Revised: May 1995

K/PH 91-3141

K-792 Switchyard/K-791 Switch Houses

Unit Name: K-797 Electrical Switchgear Room

Unit Number:

Project Status:

Unit Location: K-25 Main Plant Area, inside the K-1004-J complex

Approximate Dimensions and Capacity: 1200 ft²

Dates Operated: 1961–present

Present Function: Electrical switchgear room containing two transformers and a sandblasting machine

Life Cycle Operation: The utility room of the switchgear area was once used for sandblasting and storage of construction materials. The building also contained an emergency diesel generator and several alternators that supported testing of developmental centrifuges within the K-1004-J laboratory complex.

Waste Characteristics: No hazardous wastes

Release Data: Not applicable

Site Status: This is an active unit. This facility is also part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: None

Comments:

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K/PH95-00705

K-797 Electrical Switchgear Room

Unit Name: K-798 Switchgear Room

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area, adjacent to K-1023

Approximate Dimensions and Capacity: 1920 ft²

Dates Operated: 1971–present

Present Function: Switchgear room. The emergency diesel generator is on standby, and the alternators have been removed.

Life Cycle Operation: This unit supplies electrical power to buildings K-1023, K-1010, K-1010-A and K-1052. The building also contains an emergency diesel generator and several alternators that supported testing of the Equipment Test Facility (ETF) centrifuges.

Waste Characteristics: None

Release Data: No known releases

Site Status: This is an active unit. The facility is also a part of the Decontamination and Decommissioning Program.

Media of Concern: None

Comments:

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K-798 Switchgear Room

Unit Name: K-801 Intake Water Pumphouse

Unit Number:

Project Status:

Unit Location: K-25 Site Process Plant Area, west of K-802-H Cooling Tower Basin on the bank of Poplar Creek

Approximate Dimensions and Capacity: 984 ft². The pumphouse originally contained four 2000-gpm pumps

Dates Operated: 1944 to the late 1950s

Present Function: Inactive

Life Cycle Operation: K-801 was built as a raw water pumping and treatment facility. The facility contained four Pacific pumps, stop logs, sluice gate, traveling screen, and check valves. The raw water intake pipes and pump are located below grade in the pumphouse, which is a one-story building with transite siding and roof. In 1950, RCW (recirculating cooling water) lines began scaling and corroding due to unsoftened water being introduced from Poplar Creek, and in 1951 a water treatment facility and clarifier tank were added. In 1957 make-up water began being pumped from the Clinch River at the K-901 facility; the K-801 facility was put on standby as an emergency backup.

Waste Characteristics: Asbestos is present in siding.

Release Data: Not applicable

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: None

Comments: This unit is also known as the K-801 Water Treatment Facility.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

66-2

K-801 Intake Water Pumphouse

Unit Name: K-801-A Water Treatment Facility

Unit Number:

Project Status:

Unit Location: K-25 Site Process Plant Area, west of K-802-H Cooling Tower Basin on the bank of Poplar Creek

Approximate Dimensions and Capacity: 1801 ft²; two stories

Dates Operated: 1951 to 1954

Present Function: Inactive. The building contains empty chemical water treatment piping and tanks on the second floor.

Life Cycle Operation: K-801-A is a two-story concrete building used to treat water for the K-25 Building Recirculating Cooling Water (RCW) System. The facility was brought on line in 1951 after scaling and corrosion from Poplar Creek raw water became a problem in the K-25 Building RCW lines. The facility was built with a cathodic protection system for underground piping. After the K-892-A and -B water clarifier facilities were put on line in 1954, the K-801-A clarifier system, which had never worked satisfactorily, was shut down.

Waste Characteristics: Chromates are a suspected contaminant of concern.

Release Data: Water treatment chemicals from this facility would have been distributed to the entire K-25 Building recirculating cooling water system, to the air and nitrogen plants, and to the site-wide firefighting water system.

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Building surfaces

Comments: This unit includes the K-801-AA and K-801-BB Valve Vaults.

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: February 1995

K-801-A Water Treatment Facility

Unit Name: K-801-B Clariflow Tank

Unit Number:

Project Status:

Unit Location: K-25 Site Process Plant Area, west of K-802-H Cooling Tower Basin on the bank of Poplar Creek

Approximate Dimensions and Capacity: 8000 gpm

Dates Operated: 1951–1954

Present Function: Abandoned

Life Cycle Operation: In 1950, RCW (recirculating cooling water) lines began scaling due to raw water being introduced from Poplar Creek. The K-801-A/B facility was built in 1951 to clarify raw water from the K-801 water intake facility. After the K-892-A and -B water clarifier facilities were put on line in 1954, the K-801-A clarifier system, which had never worked satisfactorily, was shut down.

Waste Characteristics: Chemical contaminants could be present from flocculating chemicals and, possibly, from chromates.

Release Data: Chemicals used in this tank would be expected to be distributed to the entire K-25 Building, air and nitrogen plant, and site-wide firefighting water systems.

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Tank itself

Comments:

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: February 1995

K-801-B Clariflow Tank

Unit Name: K-801-H Cooling Tower and Basin

Unit Number: C003e

Project Status:

Unit Location: K-25 Process Plant Area, northwest of the K-25 Building

Approximate Dimensions and Capacity: Tower dimensions are $24 \times 60 \times 31$ for each of five cells with a 20,000-gpm capacity. Basin dimensions are $435 \times 63 \times 14$ feet. Tower contained 18 cells prior to 1979.

Dates Operated: 1944–present

Present Function: Tower in use for air conditioning system for K-1201 Air Nitrogen Plant and Building K-1401

Life Cycle Operation: An eighteen-cell tower originally provided RCW (recirculating cooling water) for the K-25 Building uranium enrichment cascade. When the cascade was shut down in 1964, the RCW system continued to serve auxiliary plant and development facilities. In 1979 five cells were rebuilt and the remaining 13 demolished. The remaining tower is a Marley treated redwood crossflow unit (TM).

Waste Characteristics: A non-chromate, Calgon Coraid (TM) polyphosphate water treatment was used prior to the late 1950s, when it was replaced by a Betz (TM) zinc/chromate/phosphate treatment. A pentachlorophenol treatment, which contains or degrades to dioxin, may have been used on the cooling tower in the 1960s.

Release Data: During operations of the gaseous diffusion process, Cr^{+6} was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr^{+3} .

Site Status: This is an active unit. The cooling tower is also part of the Decontamination and Decommissioning Program.

Media of Concern: Soil and groundwater

Comments: This unit, also known as K-802-A, is part of the K-25 Building RCW system. Active cooling towers on the K-25 Site are regularly monitored for infectious levels of Legionnaire's Disease bacteria, and industrial hygiene requirements are in place to limit exposure to pathogens at the towers.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Date Prepared: April 1987

Date Revised: June 1995

K-801-H Cooling Tower and Basin

Unit Name: K-802 Gasoline Storage Tank

Unit Number: C091

Project Status:

Unit Location: K-25 Site Process Plant Area, about 25 ft from the southeast wall of the K-802 Building

Approximate Dimensions and Capacity: Approximately 600 gal

Dates Operated: 1940s

Present Function: Inactive

Life Cycle Operation: Plans to install a gasoline engine, along with an underground fuel storage tank, for a pumphouse generator were drafted in 1944. By 1949 the gasoline generator was replaced by a diesel generator. The existing diesel tank is believed to be located near where the gasoline tank was located.

Waste Characteristics: Potential wastes from 1940s gasoline are tetraethyl lead, ethylene dibromide and dichloride, sulphur, methyl and ethyl alcohol, xylene, toluene, benzene, and alpha-methyl naphthalene.

Release Data: Reliable information is not available on the disposition of any hazardous materials that may have been used at this site.

Site Status: This unit is not managed as a discrete unit apart from the general site area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Fire Protection Water System, Gasoline Engine, and Storage Tank Piping Plan (K-802), Drawing No. 1200-M-02-13A-12, The Kellex Corporation, March 28, 1944.

Additional Gasoline Storage at K-802, Drawing No. AW-86-C, A, Carbide and Carbon Chemicals Corp., March 24, 1945.

Gasoline Storage Tank Fire Protection—Building K-802, Drawing No. AW-556-A, Rev. 1, Carbide and Carbon Chemicals Corporation, September 13, 1945.

Date Prepared: January 1993

Date Revised: June 1995

K/PH92-6235

K-802 Gasoline Storage Tank

Unit Name: K-802-H Cooling Tower Basin

Unit Number: C003g

Project Status:

Unit Location: K-25 Site Process Plant Area, plant grid northwest of the K-25 Building

Approximate Dimensions and Capacity: 340 × 63 × 14 ft

Dates Operated: 1945–present

Present Function: Basin is used for make-up for firewater.

Life Cycle Operation: Beginning in 1945, this system provided recirculating cooling water for the K-25 cascade. When the cascade was shut down in 1964, this cooling system continued to serve auxiliary plant and development facilities. The K-802-H Tower was demolished in 1979, but the basin was put to use for fire water make-up.

Waste Characteristics: A non-chromate, Calgon Coraid polyphosphate treatment (TM) was used until the late 1950s, when it was replaced by a Betz zinc/chromate/phosphate treatment (TM). A pentachlorophenol treatment, which contains or degrades to small amounts of dioxin, may have been used on this system in the 1960s.

Release Data: During operations of the gaseous diffusion process, Cr⁺⁶ was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr⁺³.

Site Status: This is an active unit.

Media of Concern: Soil and groundwater

Comments:

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: April 1987

Date Revised: June 1995

K-802-H Cooling Tower Basin

Unit Name: K-822 Cooling Tower Basin

Unit Number: C003a

Project Status:

Unit Location: K-25 Site Main Plant Area, immediately south of the K-1037 Building

Approximate Dimensions and Capacity: The main, K-822-A cooling water system was designed with a capacity of 4000 gpm. The adjacent K-822-B tower was designed for 1200 gpm.

Dates Operated: 1973–present for the main K-822-A tower and basin. The smaller, K-822-B tower was operated 1973-74.

Present Function: Low-level use in air conditioning system for K-1037 Building.

Life Cycle Operation: K-822-A provided recirculating cooling water for the K-1037 Barrier Plant until 1981, when the plant was closed. Since that time, the tower has been running at very reduced capacity for air conditioning the K-1037 Building.

Waste Characteristics: The towers used chromated water from K-802 Pumphouse, which also supplied fire water for the entire Oak Ridge Gaseous Diffusion Plant. A chromate/zinc/phosphate treatment was used for corrosion control until 1977, when the K-802 Pumphouse converted to a phosphate system. Dioxin, a degradation product of pentachlorophenol fungicide thought to have been used in K-25 Site cooling towers, is a possible contaminant for this unit.

Release Data: During operation of the gaseous diffusion process, Cr^{+6} was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr^{+3} .

Site Status: This is an active unit.

Media of Concern: Soil and groundwater

Comments: Active cooling towers on the K-25 Site are regularly monitored for infectious levels of Legionnaire's Disease bacteria, and industrial hygiene requirements are in place to limit exposure to pathogens at the towers. K-822 Cooling Tower is also known as K-1037 Cooling Tower.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: June 1995

K-822 Cooling Tower Basin

Unit Name: K-832 Recirculating Water Pumphouse

Unit Number: R175

Project Status:

Unit Location: K-25 Site Process Plant Area, west of K-27

Approximate Dimensions and Capacity: 11,097 ft²; 25,000 gpm

Dates Operated: 1946–1985

Present Function: Shutdown; the building contains electrical equipment and batteries.

Life Cycle Operation: K-832 was originally used to pump recirculating cooling water from the K-832-H cooling tower basin through the K-27 and K-29 enrichment cascade equipment. K-832 Pumphouse has a substructure consisting of two reinforced concrete channels, approximately 30 ft wide and 20 ft deep each, and reservoirs for RCW (recirculating cooling water). The building's superstructure consists of a concrete frame and exterior walls. The main bay holds six RCW pumps and motors.

Waste Characteristics: Chromates from treated RCW water

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building and equipment

Comments:

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: February 1995

K-832 Recirculating Water Pumphouse

Unit Name: K-832-H Cooling Tower and Basin

Unit Number: R151/C003i

Project Status:

Unit Location: K-25 Site Process Plant Area, west of the K-27/29 buildings

Approximate Dimensions and Capacity: Basin dimensions are $350 \times 65 \times 13$ feet. Original tower had 55,000-gpm capacity, and new tower had 25,000-gpm capacity at shutdown.

Dates Operated: 1945–1985

Present Function: Shutdown. The metal grating across the flumes is severely rusted and appears unsafe. Warning signs, chains, and new steps have been installed.

Life Cycle Operation: Began operation in 1945 as part of K-29 cascade RCW (recirculating cooling water) system. The original 14-cell tower was replaced with a five-cell tower in 1985, two months before the tower was shut down at cessation of Oak Ridge Gaseous Diffusion Plant operations. The existing tower was built of treated Douglas fir with PVC (polyvinyl chloride) cellular structure fill.

Waste Characteristics: A chromate/zinc/phosphate treatment was used to prevent RCW system scaling. Dioxin, a degradation product of pentachlorophenol fungicide thought to have been used in K-25 Site cooling towers, is a possible contaminant.

Release Data: During operations of the gaseous diffusion process, Cr^{+6} was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr^{+3} .

Site Status: The cooling tower basin is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program. The cooling tower is part of the Decontamination and Decommissioning Program.

Media of Concern: Soil and groundwater

Comments:

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K-832-H Cooling Tower and Basin

Unit Name: K-833 Cooling Water Return Pumphouse

Unit Number:

Project Status:

Unit Location: K-25 Site Process Plant Area, immediately northwest of the K-732 Switchyard

Approximate Dimensions and Capacity: 30 × 15 ft; 20,000 gpm

Dates Operated: 1946–85

Present Function: Inactive

Life Cycle Operation: This building was used as the cooling water return pumphouse for the K-27/29 recirculating cooling water. K-833 is a one-story wood frame building with transite siding and roof. It contains a large submersed water pump.

Waste Characteristics: Chromates

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program.

Media of Concern: Equipment

Comments:

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

K-833 Cooling Water Return Pumphouse

Unit Name: K-834 Valve House

Unit Number:

Project Status:

Unit Location: K-25 Site Process Plant Area, southwest of K-832 Pumphouse

Approximate Dimensions and Capacity: 150 ft²

Dates Operated: 1946–85

Present Function: Inactive. The wood floor is deteriorated.

Life Cycle Operation: This building was used as a valve house for recirculating cooling water from the K-832 Pumphouse. K-835 is a concrete vault with a wood building superstructure. The superstructure, a single-story building, has a transite roof. The original wood frame has asbestos/transite siding.

Waste Characteristics: Chromates

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building and equipment; roof and siding during demolition

Comments:

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

K-834 Valve House

Unit Name: K-861 Cooling Towers and Basins

Unit Number: R159/C0031

Project Status: Cooling Tower Demolition Project

Unit Location: K-25 Site Process Plant Area, immediately east of the K-33 and K-31 buildings

Approximate Dimensions and Capacity: K-861 Cooling Tower had a capacity of 80,000 gpm, cell dimensions of $24 \times 60 \times 31$ ft for each of 16 cells, and basin dimensions of $387 \times 63 \times 19$ ft. K-861-J had a capacity of 7,100 gpm, cell dimension of $30 \times 42 \times 26$ ft, and basin dimensions of $33 \times 45 \times 4$ ft.

Dates Operated: 1951–1985

Present Function: Demolished

Life Cycle Operation: The K-861 system provided RCW (recirculating cooling water) for K-31 cascade. K-861-H, a crossflow tower containing 16 cells, was built by Marley in July 1951. K-861-J, an adjacent one-cell counterflow tower, was built by Tower Performance in May 1979. The K-861-H and -J towers were built of treated Douglas fir and treated redwood, with treated Douglas fir and Munters fill, respectively.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control throughout operations. In 1969, a Martreat treatment (TM) was used to control biological attack in the cooling towers. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate and zinc chromate. Dioxin, a degradation product of pentachlorophenol fungicide thought to have been used in K-25 Site cooling towers, is a possible contaminant.

Release Data: In 1956 a leak caused by localized galvanic action occurred in the south K-862 supply header. Cathodic protection systems were installed. In 1968, seepage occurred at ground level. During operations of the gaseous diffusion process, Cr^{+6} was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr^{+3} .

Site Status: The cooling towers have been demolished as part of the Cooling Tower Demolition Project. The in-ground basins will remain in place, be cleaned, and be used as earthen fill areas.

Media of Concern: Soil and groundwater

Comments:

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: April 1987

Date Revised: June 1995

K-861 Cooling Towers and Basins

Unit Name: K-862 RCW Pumphouse

Unit Number: R176

Project Status: Cooling Tower Demolition Project

Unit Location: K-25 Site Process Plant Area, immediately east of K-31

Approximate Dimensions and Capacity: 87,000 gpm

Dates Operated: 1951–1985

Present Function: Shutdown

Life Cycle Operation: K-862 was built as the RCW (recirculating cooling water) facility for the K-31 Process Building. The main K-862 structure is steel framed with corrugated asbestos/cement walls and a corrugated metal deck roof. The low bay areas are built of concrete masonry unit walls, steel framed metal deck roofs, and concrete floors. The facility consists of a main high bay area containing pumps, motors, and auxiliary equipment; a low bay on the west side containing switchgear; and a small low bay on the east side. The pumphouse contains RCW pumps and a firefighting water pump. The west bay contains transformers, switchgear, and a battery room.

Waste Characteristics: Chromates

Release Data: No known releases

Site Status: This facility is scheduled for demolition as part of the Cooling Tower Demolition Project.

Media of Concern: Equipment; walls during demolition

Comments: This unit is also known as the K-31 Recirculating Cooling Water Pumphouse. The following auxiliary units are also being demolished: K-861-A and -B valve houses, K-862-5 Sulfuric Acid Tank, and K-700-A-39 Pump House Transformers.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: June 1995

K-862 RCW Pumphouse

Unit Name: K-891 Raw Water Pumphouse

Unit Number:

Project Status:

Unit Location: K-25 Site Process Plant Area, northeast of K-33

Approximate Dimensions and Capacity: 60 × 30 ft; 1558 ft² floor area

Dates Operated: 1954–85

Present Function: Inactive

Life Cycle Operation: K-891 was used to pump water from Poplar Creek to the K-892 Water Treatment Facility. The water from these facilities was used as make-up water for the K-33 RCW (recirculating cooling water) system. K-891 is a one-story building with concrete masonry walls and a concrete roof. The building contains six intake water pumps, motors, and electrical switchgear.

Waste Characteristics: Chromates

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building and equipment

Comments: This unit is also known as the K-891 Raw Water Poplar Creek Pumphouse.

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

K-891 Raw Water Pumphouse

Unit Name: K-892 Pumphouse Area

Unit Number: R177

Project Status: Cooling Tower Demolition Project

Unit Location: K-25 Site Process Plant Area, west of the K-902-4 unit of K-33

Approximate Dimensions and Capacity: 23,207 ft²

Dates Operated: 1954–89

Present Function: Storage for various materials

Life Cycle Operation: The K-892 Pumphouse was built in 1954 to pump treated water for the K-33 RCW (recirculating cooling water) system. Auxiliary units include the K-896 Recycle Blowdown Facility and K-896-A and -B Clarifier Tanks. The K-892 building consists of three sections. The northwest section contains water treatment chemical tanks and feed equipment. The east section contains 11 RCW pumps, piping, and valves. The south section contains electrical transformers, diesel fuel, and chemical storage tanks. Outside the west wall are seven transformers (some still in use) of various sizes with primary voltages up to 13.8 kV. Outside the south end of the building is an empty 500-gal diesel tank for the fire water pump engine. There are two empty 500-gal sulfuric acid tanks outside the northwest end of the building.

Waste Characteristics: There are approximately 80 lead acid batteries, each containing approximately 1 gal of sulfuric acid in the building. Less than 110 gal of flammable materials is stored in cabinets. Lime is present inside the facility. Chromates and PCBs (polychlorinated biphenyls) are possible contaminants.

Release Data: No known releases

Site Status: This facility will not be demolished but, along with K-892-Y, will be maintained for continued use.

Media of Concern: Building and equipment

Comments: The following auxiliary units are scheduled for demolition: K-892-A, -B and -C clarifiers; K-892-D, -E, -K, -M, -P, -U, and -W valve houses; K-892-V Valve House and Electrical Panels; K-892-N HCl Pump House; K-892-R, -S, and -T tanks; K-892-Q HCl Storage Tank and Basin; K-892-X Sludge Tank; K-894 Acid Unloading Station; K-894-A Railcar Transfer Station; K-896 Cooling Water Treatment Plant; K-896-A and -B clarifier tanks; K-896-C Pump House; and K-700-A-40 Pump House Transformers.

References:

Facility Survey Report, Facility K-892, FSP 12-7-94, Tennessee Department of Environment and Conservation, DOE Oversight Division, Facility Survey Program, RMO/SAFE Section.

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Phase I Hazard Screening Analysis for the K-892 Firewater and Recirculating Cooling Water Pumphouse, HS/K-892/PK/06.0/R0, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, December 1991.

Date Prepared: June 1995

K-892 Pumphouse Area

Unit Name: K-892-G Cooling Tower and Basin

Unit Number: R161a/C003m

Project Status: Cooling Tower Demolition Project

Unit Location: K-25 Site Process Plant Area, immediately east of the K-33 and K-31 buildings

Approximate Dimensions and Capacity: Cell dimensions of $32 \times 64 \times 38$ ft for each of 22 cells; basin dimensions of $350 \times 63 \times 27$ ft; capacity of 170,000 gpm

Dates Operated: 1954–1985

Present Function: Inactive

Life Cycle Operation: K-892-G provided RCW (recirculating cooling water) for the K-33 cascade before the cessation of Oak Ridge Gaseous Diffusion Plant operations in 1985. The extant unit, a counterflow treated redwood tower, was built by Foster Wheeler in April 1979. Fill material is treated redwood.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control. In 1963 and 1973, a Martreat system (TM) was used to control biological attack in the cooling tower. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate and zinc chromate. In the early 1960s, the Steam Chem system (TM), which contains semivolatile organics, was used to fight biological attack. Dioxin, a degradation product of a pentachlorophenol fungicide thought to have been used in K-25 Site cooling towers, is a possible contaminant. This tower was treated with chlorophenols fungicide in the 1960s.

Release Data: During operations of the gaseous diffusion process, Cr^{+6} was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr^{+3} .

Site Status: Only a portion of this basin will be demolished.

Media of Concern: Soil and groundwater

Comments: K-892-G Cooling Tower is also known as K-33-G Cooling Tower. The tower is being demolished as part of the Cooling Tower Demolition Project. The above-ground basin will be cleaned, demolished, left in place, and covered with soil and vegetation. A portion of the west wall of the center basin between the G and H towers will remain as the east wall of the K-892 Pumphouse.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: April 1987

Date Revised: June 1995

K/PH87-0617

K-892-G Cooling Tower and Basin

Unit Name: K-892-H Cooling Tower and Basin

Unit Number: R161b/C003n

Project Status: Cooling Tower Demolition Project

Unit Location: K-25 Site Process Plant Area, immediately east of the K-33 and K-31 buildings

Approximate Dimensions and Capacity: Cell dimensions of $32 \times 64 \times 38$ ft for each of 22 cells, basin dimensions of $350 \times 63 \times 27$ ft, capacity of 170,000 gpm

Dates Operated: 1954–1985

Present Function: Inactive

Life Cycle Operation: K-892-G provided RCW (recirculating cooling water) for the K-33 cascade before the shutdown of Oak Ridge Gaseous Diffusion Plant in 1985. The extant unit, a counterflow treated redwood tower, was built by Foster Wheeler in April 1979. Fill material is treated redwood.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control. In 1963 and 1973, a Martreat system (TM) was used to control biological attack in the tower. That process reportedly produces copper fluoride, copper chromate, zinc arsenate, copper arsenate and zinc chromate. Dioxin, a degradation product of a pentachlorophenol fungicide thought to have been used in K-25 Site cooling towers, is a possible contaminant. This tower was treated with a chlorophenols fungicide in the 1960s.

Release Data: During operations of the gaseous diffusion process, Cr^{+6} was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr^{+3} .

Site Status: Only a portion of this basin will be demolished.

Media of Concern: Soil and groundwater

Comments: K-892-H Cooling Tower is also known as K-33-H Cooling Tower. The tower is being demolished as part of the Cooling Tower Demolition Project. The above-ground basin will be cleaned, demolished, left in place, and covered with soil and vegetation. A portion of the west wall of the center basin between the G and H towers will remain as the east wall of the K-892 Pumphouse.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: April 1987

Date Revised: June 1995

K-892-H Cooling Tower and Basin

Unit Name: K-892-J Cooling Tower and Basin

Unit Number: R161c/C003o

Project Status: Cooling Tower Demolition Project

Unit Location: K-25 Site Process Plant Area, immediately east of the K-33 and K-31 buildings

Approximate Dimensions and Capacity: Cell dimensions of $42 \times 42 \times 26$ for each of 11 cells; basin dimensions of $333 \times 45 \times 4$; capacity of 78,200 gpm

Dates Operated: 1978 to 1985

Present Function: Inactive

Life Cycle Operation: K-892-J was part of the RCW (recirculating cooling water) system for the K-33 cascade. It is a treated redwood tower with Munters fill built in September 1978 by Tower Performance.

Waste Characteristics: A chromate/zinc/phosphate treatment was used for corrosion control. Dioxin, a degradation product of pentachlorophenol fungicide thought to have been used in K-25 Site cooling towers, is a possible contaminant.

Release Data: During operations of the gaseous diffusion process, Cr^{+6} was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr^{+3} .

Site Status: The cooling tower is in the process of being demolished as part of the Cooling Tower Demolition Project. The basin will be cleaned, filled with construction rubble, and covered with soil and vegetation.

Media of Concern: Soil and groundwater

Comments:

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Date Prepared: April 1987

Date Revised: June 1995

K/PH87-0626

K-892-J Cooling Tower and Basin

Unit Name: K-895 Cylinder Destruct Facility

Unit Number: C087

Project Status:

Unit Location: K-25 Site External Plant Area on the east bank of the K-901-A Holding Pond

Approximate Dimensions and Capacity: The K-895 facility includes an approximately 100-ft² sheet metal storage shed with dirt floor and approximately 1/4 acre of surrounding grassy area. The shed is located near an earthen jetty extending into the K-901-A pond.

Dates Operated: Approximately 1965–1975

Present Function: This unit is located in a grassy area enclosed by a fence and radiological boundary rope. Vehicle access from Perimeter Road is limited by a bar gate.

Life Cycle Operation: Various types of steel cylinders containing UF₆, HF, combinations of halides and chlorofluorocarbons used in laboratory work, research, and operations at the Oak Ridge Gaseous Diffusion Plant were disposed of from the K-895 facility into the K-901-A pond. Cylinder sizes included 400-lb, 12-in. diameter, and various sample containers (A, B, C, S-1, and S-2 types). An estimated 200 cylinders with inoperable valves were removed from K-1025 storage and taken to K-895/901-A for disposal. The cylinders were suspended over the K-901-A pond and shot from a distance with a mounted, high-powered rifle. After being punctured in this way, the drums were lowered into the pond until emptied of their original contents. At the onset of this disposal operation, the cylinders were simply suspended by a rope over the pond, but a cylinder chute was later built for better control. Cylinders were retrieved after the contents were released.

Since radiological contamination was detected in 1991, all pieces of radiologically contaminated equipment have been removed. A six-foot fence around the pier area will be erected during 1995.

Waste Characteristics:

Release Data:

Site Status: A remedial investigation was planned for this unit but has been delayed due to funding constraints. This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater, surface water, biota

Comments: The cylinder destruction activities carried out at this unit have been previously reported as part of the K-901-A Holding Pond write-up.

References:

Remedial Investigation Work Plan for the K-901 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR-1052/D2 (4 volumes), Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, February 1993.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

General Background Information on K-895 Cylinder Disposal House, K/EM-98, Pt. 5, Environmental Management Division, Oak Ridge K-25 Site, Oak Ridge, Tennessee, March 6, 1995.

General Background Information on K-895 Cylinder Disposal House (Addendum), K/EM-98, Pt. 5A, Environmental Management Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, April 26, 1995.

Phase I Hazard Screening Analysis for the K-895 Cylinder Disposal House and the K-901-A Holding Pond, HS/K-895/PK/35/R0, K-25 Site Plant Safety Evaluation Team, Martin Marietta Energy Systems, Inc., March 1992.

Date Prepared: January 1995

Date Revised: June 1995

K/PH93-2260

K-895 Cylinder Destruct Facility

Unit Name: K-901-A Holding Pond

Unit Number: R006

Project Status: CERCLA

Unit Location: K-25 Site External Plant Area, west of K-31 and K-33 uranium enrichment buildings and complex

Approximate Dimensions and Capacity: 5-acre surface, varying in depth to a maximum of approximately 10 ft

Dates Operated: Discharge of RCW (recirculating cooling water) blowdown into a swampy area now comprising the K-901-A Holding Pond began in the late 1950s. A dam was constructed between a marshy area and the Clinch River to create the holding pond in 1965–1966. After the discontinuation of gaseous diffusion operations in 1985, the volume of RCW blowdown was reduced drastically. RCW discharge into the holding pond was discontinued entirely in October 1989, when the K-892 clarifiers were shut down.

Present Function: The holding pond receives discharges from a 42-inch storm drain at its northeast portion. A beaver dam is located at the southwest corner of the pond just above the outflow point.

Life Cycle Operation: Over most of its operating cycle, the K-901-A Holding Pond received chemicals and sludges, primarily sludge and blowdown from the Oak Ridge Gaseous Diffusion Plant (ORGDP) RCW system. The holding pond also served as a disposal ground for the contents of select cylinders. Each of these types of waste is discussed below.

The heat of compression generated by the gaseous diffusion process was transferred to the RCW system via copper-tubed heat exchangers and then dissipated into the environment through mechanical draft cooling towers. The ORGDP RCW system recirculation rate was up to 300,000 gal/min, requiring treatment of 12,000 gal/min makeup water. The average water intake from the Clinch River for the RCW system was 11 million gal/day, with 10.3 million gal/day lost due to evaporation in the cooling towers. The evaporation resulted in the concentration of salts in the RCW system, which could potentially cause corrosion in the heat-exchange tubing. To control the salt concentration, it was necessary to remove part of the RCW from the system as blowdown and replace it with softened makeup water. The softened water was treated with lime, soda, ash, and organic coagulants for the removal of calcium, magnesium, and suspended solids.

The RCW at ORGDP was also treated with a corrosion inhibitor consisting of chromate, zinc, and a polyphosphate (a proprietary material marketed by Betz Laboratories, Inc.). While the resoftening and recycling of cooling tower blowdown was effective in eliminating this discharge to the surface, a substantial quantity of dissolved solids, such as sulfates, remained in the resoftened water. Sulfates were concentrated not only by evaporation but by the addition of sulfuric acid for pH control. RCW was discharged from the system as blowdown to the K-901-A Holding Pond and replaced with fresh makeup water to avoid exceeding the Ca^{2+} and SO_4^{2-} product solubility limits and forming scale in the cascade heat exchangers. The chromium level in the RCW was maintained at 9 ppm (18–20 ppm chromate). Since the NPDES (National Pollutant Discharge Elimination System) permit at ORGDP limited discharge from the K-901-A Holding Pond into the Clinch River to 0.05 ppm total chromium, disposal of the blowdown was of major concern. This led to the installation of the electrochemical metal reduction unit and the use of the Betz 1100 anionic polymer (TM). The electrochemical reduction unit, made by ANDCO Environmental Process (TM), uses a patented process for reduction of chromium and precipitation of metals. The ANDCO unit uses the principle of consumable iron electrodes. The blowdown passes between the electrode plates where the soluble hexavalent chromium is reduced to insoluble trivalent chromium. A ferric hydroxide and chromic hydroxide sludge was produced that separated from the blowdown in the settling pond. The unit has successfully and consistently treated blowdown to below 0.05 ppm hexavalent chromium.

The following is a chronology of events related to the discharge of RCW into the K-901-A Holding Pond.

Late 1950s: ORGDP began the discharge of RCW softening sludges and blowdown to the marsh-like K-901-A area.

1965–1966: A dam was constructed to create the K-901-A Holding Pond.

1969: Prior to installation of permanent facilities, ORGDP began to test recycling of RCW blowdown to the makeup water softeners for resoftening and reuse. Blowdown and sludges from resoftening process were discharged to K-901-A.

1974: A 100 gal/min ANDCO electrochemical metal reduction unit was obtained for the purpose of testing its feasibility for the removal of chromium from the RCW blowdown.

1976: A separate blowdown resoftener was installed. Resoftener sludges were discharged to K-901-A Holding Pond.

1977: Two 100 gal/min ANDCO electrochemical reduction units were put into service. Effluent from the process was discharged to the K-901-A Holding Pond.

1978 (summer): A 600-gal/min ANDCO electrochemical reduction unit, with the capacity of being expanded to 800 gal/min, was purchased.

1979: Investigations of methods for the reduction of the chromium levels from the K-901-A Holding Pond led to the use of a high molecular-weight anionic polymer, Betz 1100.

1979 (August): The 600 gal/min ANDCO unit was placed in service. The two 100-gal/min units were retained as backup. Twenty-four million gallons of blowdown were processed from August 1979 through March 1980 with no discharge violations. Average chromium concentration in the holding pond discharge was 0.04 ppm.

1980: A second blowdown softener was installed to improve blowdown resoftening capability and to increase capacity. Resoftener sludges were discharged to the K-901-A Holding Pond.

1985 (September): Gaseous diffusion process was placed in standby operation. Discharge of effluents from the RCW system to the K-901-A Holding Pond was discontinued.

In addition to RCW blowdown, various sizes and types of steel cylinders used in laboratory work and research and operations at ORGDP were disposed of in the K-901-A Holding Pond. Cylinder contents included uranium hexafluoride, hydrogen fluoride, combinations of halides (bromine, fluorine, chlorine) and various fluorinated/chlorinated hydrocarbons. Cylinder sizes included the 400-lb, 12-in. diam UF₆ cylinder, as well as various sample containers (A, B, C, S-1, and S-2 types).

Many of these full cylinders were eventually stored in the K-1025 Storage Building. Five hundred and thirty-three cylinders were removed from the building, along with cylinders from other locations requiring disposal. The inability to dispose of the contents of these cylinders due to inoperable valves led to an operation that involved suspending the cylinders over the K-901-A Pond, shooting them from a distance with a high-powered rifle to empty them of their contents, and then immersing them in the pond. It is estimated that from the mid 1960s to 1975 the contents of about 200 of the 533 cylinders stored at K-1025 were discharged into the K-901-A Pond in this fashion. At the onset of this disposal operation the cylinders were simply suspended by a rope over the pond, but a cylinder chute was later built for better control. Cylinders were retrieved after the contents were released.

The pond also received oil, through the storm drain system, from spills west of K-31 and K-33. An oil boom was installed to prevent oil from these spills from entering the Clinch River. Discharge was through an NPDES-permitted outflow to the Clinch River until 1992. Since that time, inflows have been from NPDES-permitted storm drains, and the outflow point has been part of the Environmental Monitoring Program.

Waste Characteristics: Primarily discharges and releases to the holding pond came from the ORGDP RCW system. Betz 1100 contains an alkenyl amide polymer.

Release Data: The K-901-A Holding Pond discharges to an NPDES-permitted outflow to the Clinch River.

Site Status: A site inspection is under way for this unit.

Media of Concern: Soil, groundwater, surface water, biota

Comments:

References:

Focused Sampling and Analysis Plan for the K-901-A Holding Pond and K-1070-A Burial Ground at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1052/V2&D3, Martin Marietta Energy Systems Inc., Oak Ridge, Tennessee, September 1994.

Remedial Investigation Work Plan for the K-901 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR-1052/D2 (4 volumes), Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, February 1993.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-901-A Holding Pond, K/HS-136, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, August 1987.

T. L. Ashwood et al., *Sediment Contamination in Streams Surrounding the OR Gaseous Diffusion Plant*, ORNL/TM-9791, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, May 1986.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Date Prepared: April 1987

Date Revised: May 1995

K/PH93-2257

K-901-A Holding Pond

Unit Name: K-901-A North Waste Disposal Area

Unit Number: R081

Project Status:

Unit Location: K-25 Site External Plant Area, west of K-33 Building, north by northeast of the K-901-A Holding Pond

Approximate Dimensions and Capacity: The K-901-A North Waste Disposal Area occupies a land area of approximately 6–8 acres. The depth of buried waste extends from the original land topography to some minimal dimension below the present disposal area contours. The precise depth is unknown.

Dates Operated: Late 1940s to mid 1970s

Present Function: Grassy area. Large areas posted as radiological control areas have been resurveyed. As a result, the control areas have been redefined, and four areas of radiological surface contamination have been fenced. The area has been posted with an Underground Radioactive Material sign.

Life Cycle Operation: Over its periods of operation the North Waste Disposal Area received waste from on-site contractors and maintenance activities. At various times the site received road bedding materials, paint cans and buckets, wallboard, lumber, soil, rock, roofing and guttering materials, piping, concrete, asphalt, steel, etc.

Waste Characteristics: Indisputable characterizations of materials disposed of at the K-901-A Sanitary Disposal Area are not available. Assessments of materials disposed at the site come from site observations and interviews with Site personnel. The disposed waste consisted generally of common construction materials interlaced with incidental amounts of low-level uranium-contaminated roofing removed from the enrichment buildings. Also chemically treated wood removed from repaired cooling towers may have been disposed of at the site. Four separate areas of radioactive surface contamination have been discovered, but there is no evidence of chemical contamination at the site.

Release Data: Surface radiological contamination was found in a 1994 walkover survey.

Site Status: A remedial investigation was planned for this unit but has been delayed due to funding restraints. This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater, surface water, and biota

Comments: This unit is also known as the K-901-A Sanitary Disposal Area.

References:

Remedial Investigation Work Plan for the K-901 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR-1052/D2 (4 volumes), Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, February 1993.

Annual Summary Report on the Surveillance and Maintenance Program for Remedial Action Inactive Waste Sites at the Oak Ridge K-25 Site, Fiscal Year 1994, K/ER-182, K-25 Environmental Restoration Program, Martin Marietta Energy Systems, Inc., November 15, 1994.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-901-A Waste Disposal Area, ORGDP, K/HS-131, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Date Prepared: May 1991

Date Revised: May 1995

K/PH93-2609

K-901-A North Waste Disposal Area

Unit Name: K-901 South Waste Disposal Area

Unit Number: R077

Project Status:

Unit Location: K-25 Site External Plant Area, west of the K-33 Building and south of the K-901-A Holding Pond

Approximate Dimensions and Capacity: Surface area of approximately 0.5 acres. Depth of buried waste extends from the original land topography to some minimal dimension below the present disposal area contours. Precise depth is unknown.

Dates Operated: Early 1950s to mid 1970s

Present Function: Inactive. Mounds of debris containing asphalt and concrete rubble are visible throughout the disposal area, primarily north of the road that traverses the site. The piles on the north side of the road are covered with grass, weeds and shrubs of varying sizes.

Life Cycle Operation: Over their periods of use, the K-901 South Waste Disposal Area, along with the K-901-A North Waste Disposal Area, received waste from on-site contractors and maintenance activities. At different times the two sites received varying quantities of road bedding materials, paint cans and buckets, wallboard, lumber, soil, rock, roofing and guttering materials, piping, concrete, asphalt, steel, etc. The hummocky appearance of this site suggests that the area has never been covered or regraded. Trees within the boundaries of this area have been removed.

Waste Characteristics: Indisputable characterizations of materials disposed of at the K-901 Waste Disposal Area are not available. Assessments of materials disposed at the site reflect interviews with Oak Ridge Gaseous Diffusion Plant personnel and site observations. The disposed waste consisted generally of common construction materials interlaced with incidental amounts of roofing removed from the enrichment buildings. Chemically treated wood removed from repaired cooling towers also may have been disposed of at the site. A radiological survey conducted in Fiscal Year 1994 revealed no radiological contamination.

Asbestos was found in a deteriorated 55-gal drum south of the road on the bank of the Clinch River in 1994. Material found to be nonfriable asbestos was removed.

Release Data: No known releases

Site Status: A remedial investigation was planned for this unit but has been delayed due to funding constraints. This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: This unit is also known as the K-901-A Contractor's Waste Disposal Area.

References:

Remedial Investigation Work Plan for the K-901 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR-1052/D2 (4 volumes), Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, February 1993.

Annual Summary Report on the Surveillance and Maintenance Program for Remedial Action Inactive Waste Sites at the Oak Ridge K-25 Site, Fiscal Year 1994, K/ER-182, K-25 Environmental Restoration Program, Martin Marietta Energy Systems, Inc., November 15, 1994.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-901-A Waste Disposal Area, ORGDP, K/HS-131, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, *Oak Ridge Gaseous Diffusion Plant*, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Date Prepared: May 1991

Date Revised: May 1995

K/PH93-2271

K-901 South Waste Disposal Area

Unit Name: K-1004 Area Lab Drain

Unit Number: R017

Project Status:

Unit Location: K-25 Site Main Plant Area, running from the area of the K-1004 group of buildings southwest to the K-1007-P1 Holding Pond

Approximate Dimensions and Capacity: 24-in. drain, approximately 0.25 mile long

Dates Operated: 1940s to the present

Present Function: Presently the drain functions as a storm drain; it also intercepts waste drains from nearby laboratory areas. Water and soap from cleaning glassware are currently the only laboratory chemicals permitted for disposal in the Area Lab Drain.

Life Cycle Operation: Process drains from buildings K-1005, K-1006 and the K-1004 group discharged into the Area Lab Drain or the SD-100 storm drain, which discharges into the K-1007-P1 Pond. Those buildings all originally contained chemical laboratories used in support of various uranium enrichment programs at Oak Ridge Gaseous Diffusion Plant and have remained in use to support other programs. K-1003, in use as a plant medical center since the 1940s, also drains into SD-100.

Drainage from buildings K-1004-A, B, C and D entered retention pits prior to combining with the SD-100 system. Six of seven pits have reportedly been covered and filled. In 1985 a Lab Waste Disposal System was implemented whereby hazardous wastes from the labs are treated, stored, or disposed of only in RCRA-permitted facilities. Water and soap from cleaning of glassware are currently the only lab chemicals permitted for disposal in the area lab drain.

Waste Characteristics: An estimated 2200 gal of laboratory wastes were discharged through lab drains each year prior to 1985. The chemicals include solvents, acids, bases and small quantities of the following:

Acetone	Mercury
Acetic acid	Methyl alcohol
Acetonitrile	Methyl ethyl ketone
Benzene	Methylene chloride
Bromoform	Nickel compounds
Cadmium	Nitric acid
Carbon tetrachloride	Phosphoric acid
Dichloropropane	Polychlorinated biphenyls
Ethanol	Photographic solutions
Ammonium hydroxide	Potassium dichromate
Chloroform	Potassium hydroxide
Chloric acid	Pyridine
Chromates	Rhenium
Diethylene glycol	Sodium hydroxide
Dibutyl ether	Sulfuric acid
Ethylene glycol	Technetium
Freons (all varieties)	Tetrachloroethylene
Hexane	Toluene
Hydroiodic acid	Trichloroethylene
Hydrofluoric acid	Tungsten
Hypophosphorous acid	Uranium
Isopropyl alcohol	

Uranium-containing solutions from analytical labs were not routinely disposed of in the area lab drain. Organic resins used for water treatment may have found their way into the drains.

Release Data: Clay pipes exiting K-1004-A, B, and C leaked and were replaced with polypropylene. No releases are recorded for the lab drain itself.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Drain line evacuations and soil samples.

Comments: This lab drain discharges into the K-1007-P1B Holding Pond (also known as K-1007-B). The discharge of chemicals was discontinued in 1985 as required by the NPDES permit that required a Best Management Practice Plan for collecting the waste solutions. The effluent of the K-1007-P1 Pond is permitted under the NPDES program.

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1004 Area Lab Drain and the K-1007-B Holding Pond, ORGDP, Oak Ridge, Tennessee, K/HS-154, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: February 1995

K-1004 Area Lab Drain

K88-14375

ORNL-DWG 88M-14375

K-1004 Area Lab Drain

Unit Name: K-1004-J Special Development Lab

Unit Number:

Project Status:

Unit Location: K-25 Main Plant Area, south of K-1200

Approximate Dimensions and Capacity: 2200 ft²

Dates Operated: late 1940s–present

Present Function: Offices; health physics training area

Life Cycle Operation: K-1004-J laboratory served from the late 1940s to mid 1950s as a research and development facility for the recovery of uranium from Hanford Reactor spent-fuel solutions. These solutions were the by-product of stripping plutonium from the reactor fuel, probably by a phosphate process, and would have contained transuranics such as neptunium, californium, and plutonium (alpha emitters); cesium (gamma emitter) and technetium (beta emitter). Some experimental work may have been done on uranium irradiated at the Oak Ridge National Laboratory (ORNL) and on Hanford slugs; however, the majority of the work appears to have been done on Hanford solutions.

The K-1004-J Radiochemical Laboratory Facility is well depicted in a series of drawings which provide some insight into the hazardous waste handling equipment and from which a preliminary characterization of the site can be made.

Laboratory Area: Personnel associated with the project indicate that the laboratory was surveyed for radioactive contamination, and that it was cleaned and decontaminated as it was being converted for the uranium oxide conversion project. The area wall and floors were painted or tiled, and the requirement that personnel working in the laboratory wear special-issue clothing and shower before lunch and after work was rescinded.

Storage Vaults: Radioactive materials were conveyed to these storage wells in lead-shielded containers on a hoist run or a monorail, deposited, and covered with sand. Some of the material stored in the wells was high in cesium. Apparently, it was all waste discard and was not for later retrieval.

No information has been obtained on how many of the wells were used. No inventory of the contents of the storage wells or records of monitoring by either Health Physics, Industrial Hygiene, or Nuclear Criticality after the uranium project was closed down has been found.

The uranium recovery from solutions of spent fuel project was followed by another research and development project for improving the conversions of UO₃ to UF₆ to improve Feed Plant production efficiencies. Some of the equipment used in the uranium recovery project was removed, and the area was decontaminated before the uranium oxide conversion project was initiated. The latter projects probably continued into the late 1950s.

Use of the K-1004-J Laboratory for gas centrifuge development work began in November 1961. In 1962–1963, centrifuge project personnel expanded the facility, pouring a 4- to 6-in. concrete slab over the site of the wells; it is assumed that the wells remained. The contents of the wells may have been removed to ORNL; however, there is no certainty at this point, and it must be assumed that they contain radioactive wastes. Major centrifuge development work terminated in 1985. Continuing centrifuge-related activities were directed to the transfer of gas centrifuge technology for applications other than uranium enrichment. A covered pit in room E-3 contains a centrifuge.

In the late 1980s and early 1990s the lab was used for power electronics research and as a health physics training area.

Waste Characteristics: Records of the specific quantities of solutions discharged through the process lines from the radiochemical laboratory operations are not available. No inventory of the contents of the storage wells during

their usage has been found. Also, no information of any residual materials currently in the wells is available. However, the Hanford Reactor spent fuel solutions would have contained the following radioactive elements:

Neptunium	Cesium
Plutonium	Technetium
Californium	Uranium

In the centrifuge process there was no additional contribution of hazardous materials other than UF₆.

Release Data: Waste solutions were sent into either the process drains or waste vaults, which are discussed in sections on the K-1004-J Vaults and K-1004-J Tanks.

Site Status: This facility is part of the Decontamination and Decommissioning Surveillance and Maintenance Program. The top of the vault visible through the floor has undergone partial decontamination and decommissioning.

Media of Concern: Building surfaces

Comments: This unit is also known as the K-1004 Radionuclide Lab, K-1004 Power Electronics Lab, and K-1004 Centrifuge Special Development Lab. There are classification concerns with this facility.

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1004-L Vaults Area, K/HS-153, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Main Chemical Laboratory Drain for Building K-1004-J, Drawing No. AWS-7367, March 26, 1948.

Radiochemical Waste Vault and Bar Schedule for Drains and Vault, Drawing No. AWS-7428, April 3, 1948.

General Architectural Plans — Radiochemical Laboratory, Drawing No. AW-A-7060-7, February 15, 1948.

Location Plan and Details for Monorail System — K-1004-J, Drawing No. AWS-7162, March 2, 1948.

Experimental Enclosure — Building K-1004-J, Drawing No. D-AW-A-13864, November 21, 1950.

Experimental Enclosure — Building K-1004-J, Drawing No. D-AW-A-13865, November 21, 1950.

Building Drains — Radiochemical Laboratory, K-25 Area, Drawing No. D-AWP-5056, February 15, 1948.

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K/PH95-00703

K-1004-J Special Development Lab

Unit Name: K-1004-J Underground Tank

Unit Number: R074

Project Status:

Unit Location: K-25 Site Main Plant Area. The pit, which once housed a 750-gal radioactivity "hot tank," is located outside the southeast corner of the old K-1004-J Radiochemical Laboratory. A larger 5,500-gal low-level waste tank is located outside the southwest corner of the old K-1004-J.

Approximate Dimensions and Capacity: 5500-gal storage tank: 6-ft diam, about 26 ft; 750-gal tank: about 4.5 ft diam $\times$ 7 ft. The hot tank sat in $6.5 \times 6.5 \times 12$ ft concrete vault.

Dates Operated: Late 1940s–1960s

Present Function: The 5500-gal tank was filled with sand, and caps were welded to the flanges to its access lines. The 750-gal hot tank has been removed.

Life Cycle Operation: This unit has served the K-1004-J Laboratory, which from the late 1940s to the mid 1950s, functioned as a research and development facility for the recovery of uranium. From the mid 1950s to the late 1950s the laboratory served as a research and development facility for the conversion of UO_3 to UF_6 . Use of the K-1004-J Laboratory for centrifuge development work began in November 1961. Major centrifuge development work terminated in 1985. Continuing centrifuge-related activities were directed to the transfer of gas centrifuge technology for applications other than uranium enrichment.

The K-1004-J Radiochemical Laboratory was originally designed as a facility to do research and development work on the recovery of uranium from spent fuel solutions from the Hanford Reactor. Some experimental work may have been done on uranium irradiated at Oak Ridge National Laboratory and on Hanford slugs; however, the majority of the work appears to have been done on Hanford solutions. The Hanford solutions were the by-product of the stripping of plutonium from the reactor spent fuel (probably by a phosphate process) and would have contained transuranics such as neptunium, californium, and traces of plutonium (alpha emitter); cesium (gamma emitter); and technetium (beta emitter). This project apparently began in the late 1940s and continued into the mid 1950s.

The uranium recovery from solutions of spent fuel project was followed by another research and development project for improving the conversions of UO_3 to UF_6 to improve Feed Plant production efficiencies. Some of the equipment used in the uranium recovery project was removed, and the area was decontaminated before the uranium oxide conversion project was initiated. The latter projects probably continued into the late 1950s. The K-1004-J Radiochemical Laboratory Facility is well described in a series of drawings which provide some insight into the hazardous waste handling equipment and from which a preliminary characterization of the site can be made.

Details of an elaborate drain system for the K-1004-J Laboratory show that drains tied to the 750-gal tank in the vault at the southeast corner of K-1004-J and to the 5500-gal underground storage tank due south of the entrance corridor to K-1004-J. The laboratory's process drainage went to SD-100 for eventual discharge into the K-1007-P1 pond.

Storage wells were located just outside the center double doors at the back (east side) of the K-1004-J Building and were used to store waste discards conveyed from the laboratory by a hoist on a monorail.

Dispositions of potentially hazardous equipment and materials employed in the project for the recovery of uranium from spent fuel solutions were as follows:

Hot Cell or Reactor Vessel: It is assumed that the hot cell located in the lab's northeast interior would have been decontaminated to permit dismantling and removal. It was dismantled by breaking up its basic concrete structure with hydraulic jacks. The remains of the cell and its appurtenances were apparently hauled to the "Y" disposal area formed near the intersection of Tennessee State Highways 58 and 95.

Drain Lines and Trenches: It is assumed that the drain lines were flushed to minimize exposure to personnel in handling and then removed to a burial or disposal area. Where the removal was not possible, the trenches would have been decontaminated and left in place. Interviews with personnel associated with the project indicate that the highly radioactive drains from the laboratory discharged to the vault (hot tank), while lower-level wastes discharged to the large 5500-gal underground storage tank. Wastes from both of these tanks were hauled to ORNL for disposal.

Hot Tank: Personnel associated with the operations say that the 750-gal hot tank was removed and taken to the K-1064 Peninsula Area and later removed to the "Y" disposal area formed near the intersection of Tennessee State Highways 58 and 95. The concrete vault and appurtenances were probably taken to the same place. It might be expected that the ground and any foundation remains in this area would be contaminated.

Large (5500-gal) Storage Tank: This tank was flushed and decontaminated to a level at which it was decided to weld caps or flanges to its access lines and leave it buried. Around 1980, during excavation for a road to access centrifuge facilities behind K-1004-J, this tank was partially uncovered. Gas samples were first taken, followed by samples of the residue from the bottom of the tank. Analysis of these samples was negative; the tank was filled with sand, the openings welded shut, and the tank covered with fill. This implies either that the tank was effectively decontaminated or that the tank did not contain any highly radioactive materials.

Laboratory Area: Personnel associated with the operation indicate that the laboratory was surveyed for radioactive contamination and that it was cleaned and decontaminated as it was being converted for the uranium oxide conversion project. The area walls and floors were painted or tiled, and the requirement that personnel working in the laboratory wear special-issue clothing and shower before lunch and after work was rescinded.

Waste Characteristics: Records of the specific quantities of solutions discharged through the process lines from the radiochemical laboratory operations are not available. No inventory of the contents of the storage wells during their usage has been found. Also, no information of any residual materials currently in the wells is available. However, the Hanford Reactor spent fuel solutions would have contained the following radioactive elements:

Neptunium	Cesium
Plutonium	Technetium
Californium	Uranium

In the centrifuge process there was no additional contribution of hazardous material other than UF_6 .

Release Data: A radioactive hot spot has been found in the general area of the large tank.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program and has been posted as an underground radiological area.

Media of Concern: Soil, groundwater

Comments:

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1004-L Vaults Area, K/HS-153, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 1988.

Main Chemical Laboratory Drain for Building K-1004-J, Drawing No. AWS-7367, March 26, 1948.

Radiochemical Waste Vault and Bar Schedule for Drains and Vault, Drawing No. AWS-7428, April 3, 1948.

General Architectural Plans — Radiochemical Laboratory, Drawing No. AW-A-7060-7, February 15, 1948.

Location Plan and Details for Monorail System — K-1004-J, Drawing No. AWS-7162, March 2, 1948.

Experimental Enclosure — Building K-1004-J, Drawing No. D-AW-A-13864, November 21, 1950.

Experimental Enclosure — Building K-1004-J, Drawing No. D-AW-A-13865, November 21, 1950.

Building Drains — Radiochemical Laboratory, K-25 Area, Drawing No. D-AWP-5056, February 15, 1948.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: May 1991

Date Revised: June 1995

K/PH87-0726

K-1004-J Underground Tank

Unit Name: K-1004-J Vaults

Unit Number: C046

Project Status:

Unit Location: K-25 Site Main Plant Area. The six vaults are located just east of the original rear door of the K-1004-J Radiochemical Laboratory in what is now a Health Physics Department training area.

Approximate Dimensions and Capacity: Six vaults are approximately 30-inch diameter by approximately 8-ft-deep concrete pipe.

Dates Operated: Late 1940s–early 1960s

Present Function: Health physics training room

Life Cycle Operation: This unit has served the K-1004-J Laboratory, which, from the late 1940s to the mid 1950s, functioned as a research and development facility for the recovery of uranium. From the mid 1950s to the late 1950s the laboratory served as a research and development facility for the conversion of UO_3 to UF_6 . Use of the K-1004-J Laboratory for centrifuge development work began in November 1961. Major centrifuge development work terminated in 1985. Continuing centrifuge-related activities were directed to the transfer of gas centrifuge technology for applications other than uranium enrichment.

The K-1004-J Radiochemical Laboratory was originally designed as a facility to do research and development work on the recovery of uranium from spent fuel solutions from the Hanford Reactor. Some experimental work may have been done on uranium irradiated at Oak Ridge National Laboratory (ORNL) and on Hanford slugs; however, the majority of the work appears to have been done on Hanford solutions. The Hanford solutions were the by-product of the stripping of plutonium from the reactor spent fuel (probably by a phosphate process) and would have contained transuranics such as neptunium, californium, and traces of plutonium (alpha emitter); cesium (gamma emitter); and technetium (beta emitter). This project apparently began in the late 1940s and continued into the mid 1950s. The uranium recovery from solutions of spent fuel project was followed by another research and development project for improving the conversions of UO_3 to UF_6 to improve feed plant production efficiencies. Some of the equipment used in the uranium recovery project was removed, and the area was decontaminated before the uranium oxide conversion project was initiated. The latter projects probably continued into the late 1950s. The K-1004-J Radiochemical Laboratory Facility is well described in a series of drawings which provide some insight into the hazardous waste handling equipment and from which a preliminary characterization of the site can be made.

An elaborate drain system for the K-1004-J Laboratory tied to a 750-gal tank at the southeast corner of K-1004-J and to a 5500-gal underground storage tank due south of the entrance corridor to K-1004-J. Storage wells were located just outside the center double doors at the back (east side) of the K-1004-J Building and were used to store waste discards conveyed from the laboratory by a hoist on a monorail. Dispositions of potentially hazardous equipment and materials employed in the project for the recovery of uranium from spent fuel solutions were as follows:

Laboratory Area: Personnel associated with the project indicate that the laboratory was surveyed for radioactive contamination and that it was cleaned and decontaminated as it was being converted for the uranium oxide conversion project. The area wall and floors were painted or tiled, and the requirement that personnel working in the laboratory wear special-issue clothing and shower before lunch and after work was rescinded.

Storage Vaults: Radioactive materials were conveyed to these storage wells in lead-shielded containers on a hoist run or a monorail, deposited, and covered with sand. Some of the material stored in the wells was high in cesium. Apparently, it was all waste discard and was not for later retrieval. No information has been obtained on how many of the wells were used. No inventory of the contents of the storage wells or records of monitoring by either Health Physics, Industrial Hygiene, or Nuclear Criticality after the uranium project was closed down have been

found. A detailed example of the precautions taken when dealing with material to be placed in these pits is found in a 1948 letter, referenced below.

The K-1004-J Laboratory was taken over by the centrifuge project in November 1961. In 1962–1963, centrifuge project personnel expanded the facility, pouring a 4- to 6-in. concrete slab over the site of the wells; it is assumed that the wells remained. The contents of the wells may have been removed to ORNL; however, there is no certainty at this point, and so it must be assumed that they contain radioactive wastes. The top of one of the vaults is now visible in the floor of the Power Electronics Laboratory.

Waste Characteristics: Records of the specific quantities of solutions discharged through the process lines from the radiochemical laboratory operations are not available. No inventory of the contents of the storage wells during their usage has been found. Also, no information of any residual materials currently in the wells is available. However, the Hanford Reactor spent fuel solutions would have contained the following radioactive elements:

Neptunium	Cesium
Plutonium	Technetium
Californium	Uranium

In the centrifuge process there was no additional contribution of hazardous materials other than UF₆.

A December 1991 radioactivity survey revealed significant neutron activity in one of the six vaults. A 1994 estimate of the amount of neutron emitting material in the vaults revealed a wide range of possibilities because exact information does not exist on the type of, depth of, and covering over material in the pits.

Release Data: No known releases

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater

Comments:

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1004-L Vaults Area, K/HS-153, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Main Chemical Laboratory Drain for Building K-1004-J, Drawing No. AWS-7367, March 26, 1948.

Radiochemical Waste Vault and Bar Schedule for Drains and Vault, Drawing No. AWS-7428, April 3, 1948.

General Architectural Plans — Radiochemical Laboratory, Drawing No. AW-A-7060-7, February 15, 1948.

Location Plan and Details for Monorail System — K-1004-J, Drawing No. AWS-7162, March 2, 1948.

Experimental Enclosure — Building K-1004-J, Drawing No. D-AW-A-13864, November 21, 1950.

Experimental Enclosure — Building K-1004-J, Drawing No. D-AW-A-13865, November 21, 1950.

Building Drains — Radiochemical Laboratory, K-25 Area, Drawing No. D-AWP-5056, February 15, 1948.

Inter-company correspondence from A. A. Abuttal, Mechanical Engineering Section, to R. B. Korsmeyer, K-1401-1 Building, Re: Transfer of Samples from Truck to Concrete Pit, Carbide and Carbon Chemicals Corporation, Oak Ridge, Tennessee, July 27, 1948.

Internal correspondence from D. C. Landguth, ORNL MAD Group, to J. L. Haymore, K-25 Environmental Restoration Program, Preliminary Site Walk-Over of K-1004-J Vaults, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 24, 1991.

Internal correspondence from J. Michael Whitaker to Steve Mead, NDA Measurement of Six Underground Vaults in Building K-1004-J, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 15, 1992.

Internal correspondence from R. C. Hagenauer to J. R. Lyons, K-25 Environmental Restoration Program, Estimates of Nuclear Material Content in the Floor Vault in K-1004- J, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 5, 1994.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K-1004-J Vaults

K/PH91-3137

Unit Name: K-1004-L Pilot Plant

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area, east of K-1001

Approximate Dimensions and Capacity: 46,266 ft²

Dates Operated: 1950–84

Present Function: The Decontamination and Decommissioning Program is responsible for only 10,000 ft² of this building. The remainder has not been surplused and is in use.

Life Cycle Operation: K-1004-L was built in 1950, and the offices and laboratories necessary to support its operation were added later. The pilot plant portion of the building operated continuously from 1950 until shutdown in 1984. The function of the plant was to demonstrate improvements in the quality of the gaseous diffusion barrier that could result in an increase in the production capacity of the gaseous diffusion plants. The K-1004-N Cooling Tower was part of this operation.

The floors of K-1004-L are poured concrete, and the walls are concrete block. The pilot plant consists of six cells that extend from the first floor into the mezzanine level. The motor alleys that separate the cells contain the stage motor compressor sets for the adjacent cells. Supporting oil, coolant, evacuation, and some gas sampling systems are located at the cell's perimeter on the first floor. Process gas feed, withdrawal, and top sample systems are located at the cell's perimeter on the mezzanine floor.

Waste Characteristics: Mixed chemical and radiological contamination

Release Data: Releases of UF₆ gas would have been largely contained within the building. Fluorine or chlorine trifluoride, used to unplug process equipment containing UF₆, was vented through an airjet on the roof of the building.

Site Status: The shutdown portion of this building is part of the Decontamination and Decommissioning Program.

Media of Concern: Soil and groundwater

Comments: This unit is also known as the K-1004-L Laboratory Facility. There are classification concerns associated with this facility.

References:

Building Characterization Report, ORGDP Shutdown Facilities, K-1004, XMTL TI SS/D 88-0040, January 1988.

Date Prepared: June 1995

K/PH95-00702

K-1004-L Pilot Plant

Unit Name: K-1004-L RCW Lines/K-1004-N Cooling Towers

Unit Number: C003c

Project Status: Cooling Tower Demolition Project

Unit Location: K-25 Site Main Plant Area, south of the K-1004 Building and west of Portal 3

Approximate Dimensions and Capacity: The supply header is 10 inches in diameter and 168 ft long. The return header is 10 inches in diameter and 170 ft long. The makeup water line is 4 inches in diameter and 133 ft long. Total length of RCW (recirculating cooling water) lines is approximately 550 linear feet.

Dates Operated: Mid-1950s to 1984

Present Function: The tower has been demolished.

Life Cycle Operation: K-1004-N Cooling Tower and RCW lines served the K-1004-L Cascade Pilot Plant. Makeup water came from the firewater system.

Waste Characteristics: Makeup water contained a chromate/zinc/phosphate treatment until 1977, when it was replaced by a phosphate treatment system. A pentachlorophenol fungicide treatment, which contains or degrades to traces of dioxin, may have been used on this system.

Release Data: During operations of the gaseous diffusion process, Cr^{+6} was found in soil and foliage on the leeward side of K-25 Site cooling towers. However, it is thought that these chemicals would have been reduced to Cr^{+3} .

Site Status: These RCW lines area under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: K-1004-L Cooling Tower is also known as K-1004-N.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: June 1995

K-1004-L RCW Lines/K-1004-N Cooling Towers

Unit Name: K-1004-Q Centrifuge Laboratory

Unit Number: None

Project Status:

Unit Location: K-25 Site Main Plant Area, in the K-1023 complex

Approximate Dimensions and Capacity: 1200 ft², plus a pit measuring 25 × 25 × 14 ft deep and an additional 12-ft pit under about a third of the middle pit

Dates Operated: 1971-85

Present Function: Inactive

Life Cycle Operation: K-1004-Q was part of a high bay addition to the Equipment Test Facility (ETF) complex. The ETF was built for examining the reliability testing of four types of high-capacity gas centrifuges. This building is concrete block and steel frame construction with a prestressed concrete roof. The area contains a large pit covered with an open grating. The high bay contains a 1.5-ton overhead crane and a portable 5-ton gantry crane.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases

Site Status: This building is part of the Decontamination and Decommissioning Program.

Media of Concern: Building surfaces and equipment

Comments: There are classification concerns associated with this facility.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K-1004-Q Centrifuge Laboratory

Unit Name: K-1007 Gas Tank

Unit Number: U007

Project Status: UST

Unit Location: K-25 Site Main Plant Area, near the K-1007 Building

Approximate Dimensions and Capacity: 200 gallons

Dates Operated: 1950s–1986

Present Function: Parking/dumpster area

Life Cycle Operation: Gasoline storage

Waste Characteristics: Gasoline components

Release Data: On August 28, 1986, the tank was discovered to be leaking. The gasoline that leaked from the tank entered into a sanitary sewer lift station. The gasoline was removed from the lift station, and the tank was removed following clean-up of the spill. However, a residue of gasoline remained in the soil around the tank.

Site Status: This unit is not maintained as a discrete facility apart from general site surveillance and maintenance activities.

Media of Concern: Soil

Comments:

References:

Date Prepared: April 1987

Date Revised: February 1995

K/PH91-3136

K-1007 Gas Tank

Unit Name: K-1007-P1 Holding Pond

Unit Number: R044

Project Status:

Unit Location: K-25 Site Main Plant Area, outside the perimeter fence and bounded by Oak Ridge Turnpike, Burchfield Road and Contractors Road

Approximate Dimensions and Capacity: 25 acres

Dates Operated: 1950s–present

Present Function: Stormwater retention

Life Cycle Operation: The K-1007-P1 Holding Pond receives storm drainage, along with wastes from the K-1004 Area Lab Drain. Since 1985 discharges from the area lab drain have been limited to water and soap from the cleaning of glassware. Outflow into Poplar Creek has been permitted by the National Pollutant Discharge Elimination System (NPDES) since 1974.

Waste Characteristics: An estimated 2200 gallons of laboratory wastes were discharged through lab drains each year prior to 1985. Waste chemicals included solvents, acids, bases and small quantities of the following:

Acetone	Mercury
Acetic acid	Methyl alcohol
Acetonitrile	Methyl ethyl ketone
Benzene	Methylene chloride
Bromoform	Nickel compounds
Cadmium	Nitric acid
Carbon tetrachloride	Phosphoric acid
Dichloropropane	PCB (polychlorinated biphenyl)
Ethanol	Photographic solutions
Ammonium hydroxide	Potassium dichromate
Chloroform	Potassium hydroxide
Chloric acid	Pyridine
Chromates	Rhenium
Diethylene glycol	Sodium hydroxide
Dibutyl ether	Sulfuric acid
Ethylene glycol	Technetium
Freons (all varieties)	Tetrachloroethylene
Hexane	Toluene
Hydroiodic acid	Trichloroethylene
Hydrofluoric acid	Tungsten
Hypophosphorous acid	Uranium
Isopropyl alcohol	

Uranium-containing solutions from analytical labs were not routinely disposed of in the area lab drains. Organic resins used for water treatment may have found their way into the drains. PCB contamination has also been detected in the pond.

When pond waters were lowered during pond upgrade activities in 1995, five metal drums containing concrete and metal scrap were discovered. Analyses revealed that the contents were not PCB contaminated, but the contents exceeded background limits for radioactivity and have been stored as low-level radioactively contaminated material.

Release Data: In September 1993, four largemouth bass in the pond were found to contain a mean PCB concentration of 33.7 ppm. Immediate actions were taken to deter public access to the pond and determine the extent of PCBs in the pond. Further sampling of inlets and outlets to and from the pond suggested that discharges of PCBs to the pond and transport of PCBs from the pond to Poplar Creek were not occurring. Samples later taken of five Canada geese had PCB levels below the detection limit of 0.35 ppm.

In 1993, an approximately 2 ft² puddle of thick grease was found near the site of an old railroad handcar shed near the bank of the pond. The grease was tested and found not to be radiologically or PCB contaminated, and the grease was removed.

Site Status: This is an active unit.

Media of Concern: Soil, groundwater

Comments: Discharge from the holding pond is permitted under the NPDES program. This pond has also been known as the K-1007-B Pond. Four smaller ponds, K-1007-P2, -P3, -P4, and -P5, are connected by culverts to the P1 pond.

References:

Polychlorinated Biphenyls Data for Canada Geese. Letter from K. W. Cook, Martin Marietta Energy Systems K-25 Environmental Restoration Program, to R. E. Frounfelker, DOE K-25 Site Environmental Program, Letter No. ER-K-93/251, November 22, 1993.

Polychlorinated Biphenyls (PCBs) in Fish from K-1007-P1 Pond, Oak Ridge K-25 Site. Letter from R. S. Eby, Martin Marietta Energy Systems K-25 Site Manager, to T. S. Tison, DOE K-25 Site Manager, October 27, 1993.

U.S. Army Corps of Engineers Permit Addendum for the K-1007 Ponds Improvement Project—Oak Ridge K-25 Site. Letter from R. S. Eby, Martin Marietta Energy Systems K-25 Site Manager, to T. S. Tison, DOE K-25 Site Manager, January 26, 1995.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1004 Area Lab Drain and the K-1007-B Holding Pond, ORGDP, Oak Ridge, Tennessee, K/HS-154, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, December 1988.

Date Prepared: April 1987

Date Revised: June 1995

K/PH87-0630

K-1007-P1 Holding Pond

Unit Name: K-1010 Laboratory, Receiving and Handling

Unit Number: None

Project Status:

Unit Location: K-25 Site Main Plant Area, adjacent to the northeast corner of K-1023

Approximate Dimensions and Capacity: 3200 ft²

Dates Operated: 1972–85

Present Function: Gas centrifuge development testing has been discontinued.

Life Cycle Operation: K-1010 initially contained several alternators that supported testing of developmental gas centrifuges and a storage area for miscellaneous instrument and electrical supplies. The building is constructed of steel beams on a concrete slab with insulated metal siding.

Waste Characteristics: Uranium enrichment products, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building interior and equipment

Comments: K-1010-A upper suspension recycle/assembly facility is a subunit of K-1010. There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K-1010 Laboratory, Receiving and Handling

Unit Name: K-1023 Laboratory

Unit Number: None

Project Status:

Unit Location: K-25 Site Centrifuge Area

Approximate Dimensions and Capacity: 180 × 40 ft

Dates Operated: 1971–85

Present Function: Computer center (K-1023), office complex (K-1005), storage of laboratory equipment (green laboratory)

Life Cycle Operation: K-1023 was initially used for development and reliability testing of high-capacity gas centrifuges. Later the area was used for centrifuge hardware receiving, assembly, testing, and storage; a computer area; a spin test facility; and a materials test laboratory. K-1023 is a high bay area constructed of steel beams on a concrete slab with insulated metal siding.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building interior

Comments: Subunits are K-1009, K-1009-A control room, and K-1005 office complex.

There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K/PH95-00701

K-1023 Laboratory

Unit Name: K-1024 Buildings

Unit Number:

Project Status:

Unit Location: K-25 Site, within the courtyard of the K-25 Building "U"

Approximate Dimensions and Capacity: 4800 ft² floor area

Dates Operated: 1944–present

Present Function: Office area. The filter test facility for all high-efficiency particulate air (HEPA) filters used at the Oak Ridge K-25 Site, Oak Ridge Y-12 Plant, and Oak Ridge National Laboratory is located in the southern portion of the building.

Life Cycle Operation: K-1024 was built to provide a maintenance shop for repair and calibration of the instruments used in the control and operation of the K-25 uranium enrichment cascade. Prior to the relocation of the instrument maintenance shops to K-1035 in 1963, a central acid cleaning area was installed in the building's west wing. After this relocation, the building was used for the Centrifuge Development Laboratory and the Filter Test Facility. The maintenance shop equipment has been removed. This building is a one story, wood frame structure with cement/asbestos siding.

Waste Characteristics: No known contaminants

Release Data: No known releases

Site Status: These are active facilities and are also part of the Decontamination and Decommissioning Program.

Media of Concern: Asbestos at demolition

Comments: K-1024-B, -C, and -D are subunits of this facility.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Sampling Workplan, K-1024 Diluting Pit, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, Unnumbered draft, Martin Marietta Energy Systems, Inc., October 1988.

Date Prepared: March 1995

K-1024 Buildings

Unit Name: K-1024 Dilution Pit

Unit Number: R082

Project Status:

Unit Location: K-25 Site Main Plant Area, near the center of the K-25 Process Building

Approximate Dimensions and Capacity: The inside dimensions of the pit are $5 \times 4 \times 5$ ft. The mixed solution capacity is 80 ft³.

Dates Operated: This unit was used for instrument shop operations, 1945–1963, and gas centrifuge development laboratory operations, 1970–1985.

Present Function: This unit has been on standby since 1985. The diluting pit has been filled and covered with asphalt for a parking area.

Life Cycle Operation: Originally, the K-1024 Diluting Facility accommodated the Oak Ridge Gaseous Diffusion Plant (ORGDP) instrument maintenance shops. The acid/solvent stream was diluted by sanitary water entering the head of the acid waste line. The facility's sanitary flow and acid/solvent flow are each handled by independent drain lines. A 4-in. acid waste line flowed through the dilution pit before discharge into the K-25 Site storm drain system.

With the exception of the initial facility acceptance test, which was probably conducted in 1944 or 1945, no records of any leak tests are available.

Prior to cessation of instrument maintenance operations in 1963, a central acid cleaning area was located at the south end of the west wing of Building K-1024. Available drawings indicate that this operation released process wastes to the building's original acid waste lines. In instrument shop operations associated with the cleaning of process instruments, the acids used included hydrochloric acid, aqueous hydrofluoric acid, nitric acid, and chromic acid. Solvents were trichlorethylene, isopropyl alcohol, and freon TF.

Waste Characteristics: Although there is no radioactive contamination suspected, it is conceivable that uranium could have entered the pit from cleaning solutions used in processing recycled instruments from the uranium enrichment cascade. Other possible contaminants are metals and organics.

Release Data: No documented incidents of uncontrolled waste releases exist. However, releases via drain system failures or overload of pit capacity are conceivable.

Site Status: In February 1989, three samples of the soil surrounding the diluting pit site were collected and analyzed for uranium, metals, and volatile and semivolatile organics. The results of this sampling effort were inconclusive as to the origin and extent of contamination. This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, ground water, surface water, storm drains

Comments: The K-1024 Dilution Pit is in close proximity to the shut-down K-25 Uranium Enrichment Process Building, where contamination at the pit may have originated.

References:

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Sampling Workplan, K-1024 Diluting Pit, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, Unnumbered draft, Martin Marietta Energy Systems, Inc., October 1988.

Date Prepared: May 1991

Date Revised: March 1995

K/PH93-3135

K-1024 Dilution Pit

Unit Name: K-1025-E Warehouse

Unit Number:

Project Status:

Unit Location: Immediately north of the K-25 Process Building, adjacent to the K-1066-F Cylinder Storage Yard

Approximate Dimensions and Capacity: 800 ft²

Dates Operated: 1945–present

Present Function: Empty

Life Cycle Operation: This building is one of a series of storage buildings at the northern portion of the K-25 Site. K-1025 has been used for storage of a variety of materials, including uranium. This building is a one story, wood frame structure with cement/asbestos siding.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building surfaces; asbestos at demolition

Comments:

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

101-2

K-1025-E Warehouse

Unit Name: K-1027 Service Station

Unit Number: C086

Project Status:

Unit Location: K-25 Site Main Plant Area, outside the perimeter fence 25 ft west of 6th Street

Approximate Dimensions and Capacity: The K-1027 station was served by a 5000-gal underground storage tank.

Dates Operated: 1940s

Present Function: Parking lot

Life Cycle Operation: This unit was used as a fueling and repair station for the K-1026 bus terminal located nearby. The station is thought to have been closed near the time that the K-1414 Garage was put into operation in 1949. No information has been found on the disposition of the underground fuel tank.

Waste Characteristics: The following contaminants are associated with gasoline, lubricating oils, antifreeze, and miscellaneous chemicals used in maintenance shops in the 1940s: sulphur derivatives, paratone, acrylic esters, phosphites, tin salts; calcium, barium and other metallic soaps; passive sulphur-chlorine, lead-active sulphur, naphthionic lube oil, kerosene, turpentine, ethylene glycol, tetraethyl lead, ethylene dibromide and dichloride, methyl and ethyl alcohol, xylene, toluene, benzene, and alpha-methyl naphthalene.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Floor Plan, Elevations; Bus Gas and Repair Station, Drawing No. KF-1200-K-30-HA, 2, The Kellex Corporation, December 5, 1944.

Grading and Drainage Plan on C Street: Bus Terminal, Rev. 7 As Built, Drawing No. KF-1200M-02-DA-4, The Kellex Corporation, September 28, 1945.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Date Prepared: January 1993

Date Revised: June 1995

K-1027 Service Station

Unit Name: K-1031 Storage Building

Unit Number: D001

Project Status:

Unit Location: K-25 Site Process Plant Area between K-306-6 and Poplar Creek

Approximate Dimensions and Capacity: 76 by 35 ft; 2902 ft² floor space

Dates Operated: 1946–79

Present Function: Abandoned

Life Cycle Operation: This building was used as a maintenance storage building until 1948, when it began to be used as a storage building for the nearby K-1410 decontamination facility. This type of storage was discontinued in 1962, and in 1963 the building was converted to a paint storage facility. The building was abandoned in 1979. An underground storage tank located near the building was removed in 1980. K-1031 is a one story, wood frame building with corrugated transite siding.

Waste Characteristics: Waste generated from uranium decontamination and recovery operations include organic degreasers, uranium compounds, and trace quantities of transuranics. Facility floors are contaminated with radionuclides sealed under paint. Asbestos is present in the building.

Release Data: No known releases

Site Status: Remediation of this facility is planned as an integrated D&D/RA (Decontamination and Decommissioning/Remedial Actions) project interim action.

Media of Concern: Building and equipment surfaces

Comments: K-1031-A is a subunit of this facility.

References:

Site Descriptions of Environmental Restoration Units at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-47, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 1991.

Facility Survey at K-1031. Letter from J. Dale Rector, TDEC DOE Oversight Division, to Richard Frounfelker, DOE K-25, November 16, 1994.

Date Prepared: August 1994

Date Revised: March 1995

K-1031 Storage Building

Unit Name: K-1035 Acid Pits

Unit Number: R083

Project Status:

Unit Location: K-25 Site Main Plant Area, near the south end of building K-1035

Approximate Dimensions and Capacity: The printed circuit board facility's acid pit has a diameter of 34 in. and a depth of 38 in. The acid cleaning area's neutralization pit has a 28 in. diameter and 24 in. depth to the top of the stone base. The total depth (including the depth below the stone base) is not known. Process flows occurred in batch quantities amounting to approximately 100 gal/week through each pit. K-25 Site block plans show that the process drain lines from the acid pit and the neutralizing pit flowed to a single catch basin in the area water drain system.

Dates Operated: The pits served the Acid Cleaning Area from the early 1960s to 1985 and the Printed Circuit Board Facility from the early 1960s to 1976 or 1977.

Present Function: The Printed Circuit Board Facility was dismantled over a period of time. The dismantling operation, including the removal of the adjoining chemicals storage shed, was completed in 1990. The Acid Cleaning Area is on standby, with no current activity. The pits are now covered and the lines that lead to them turned off. A removable cover for the catch basin has been installed.

Life Cycle Operation: The acid and neutralization pits received acid and solvent wastes primarily from two dedicated instrument shops in Building K-1035: the Printed Circuit Board Facility, which was shut down in 1977 and partly decommissioned, and the Acid Cleaning Area, which is in a standby mode with equipment in place, capable of restart operations as needed.

The fabrication process at the Printed Circuit Board Facility used both electroless and electrolytic copper plating processes. Before the plating steps, the boards were dampened with an accelerator and an activator/catalyst (Department of Transportation classification: hydrochloric acid mixture). The solution used for the electroless copper plating step was a copper mix concentrate identified as a dilute sodium hydroxide solution (Department of Transportation classification: caustic soda solution). The electrolytic plating solution was copper sulfate. Following the copper plating steps, an etching process was employed to produce the circuit configuration. The etching agents (copper dissolvers) were ferric chloride and ammonia perchlorate. The solvents employed throughout the circuit board fabrication process include trichlorethylene, isopropyl alcohol, and freon TF (liquid at room temperature). The K-1035 Acid Pit received the acid and solvent wastes from the circuit board fabrication process.

The Acid Cleaning Area located in the southwest section of Building K-1035 has accommodated the chemical cleaning of instruments and components (materials such as copper, stainless steel, nickel, etc.). The cleaning acids included hydrochloric acid, aqueous hydrofluoric acid, nitric acid, and chromic acid. The solvents included trichlorethylene, isopropyl alcohol, and Freon TF.

In addition to the facilities described above, the glass shop, the pneumatic repair shop, and the line recorder cleaning station in Building K-1035 have at times used acids and solvents that may have entered the building's sanitary drains. However, the released wastes are judged by the facility manager to have been minimal and as such would have been adequately diluted by sanitary water flushes prior to the entering the K-25 Site sanitary sewer system.

Waste Characteristics: The volume and composition of the wastes handled by the acid and neutralization pits varied with time. A former facility manager familiar with the subject operations estimates that an average of approximately 100 gal/week of process wastes was released in batch quantities to each of the two pits. At times the acid and solvent cleaning area processed uranium-contaminated instruments. In these cases, the process could have contributed uranium to the discharge from this area.

Release Data: As noted above

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater, and surface water

Comments:

References:

K-25 Site Environmental Restoration Program, RCRA Facility Investigation Plan, K-1035 Acid Pit Area, ES/ER-2/D1, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, September 1990.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Shop Cleaning Facility Plan and Sections, Drawing No. S1E53511A, Union Carbide Corporation Nuclear Division, May 1980.

Cleaning Facility Plans and Sections, Drawing No. S1E53511B, Union Carbide Corporation Nuclear Division, August 1981.

Date Prepared: December 1990

Date Revised: February 1995

K/PH91-3116

K-1035 Acid Pits

Unit Name: K-1035 Gasoline Station

Unit Number: C092

Project Status:

Unit Location: K-25 Site Main Plant Area, immediately east of Column 12 in Building K-1035

Approximate Dimensions and Capacity: Original proposal was for a 720 gal underground tank

Dates Operated: 1940s-1950s

Present Function: Inactive

Life Cycle Operation: Inquiries of retirees and employees on the existence of a gasoline filling station on the west side of K-1401 yielded mixed results. Those who remembered a filling station in the area thought they had gassed up at a pump located across Avenue F from Door 2W at 11th street, associating it with the K-1036 Stores building at that corner. A few recalled it as being further north off the loading platform near the middle of K-1036.

The credibility of reports on a station in the vicinity of Avenue G and 11th Street increased with the discovery of Work Order No. 259001, dated May 10, 1948: "Move this storage tank now at SW of K-1049 building and install in front of K-1401 building at 11th Street connecting it to an existing gasoline dispensing pump at that location."

An entry in the K-25 Plant Quarterly Report K-803, dated April 1 to June 30, 1952, reads: "Moving gasoline pump on Avenue F relocating to east of K-1035. Tank moved from Power House to building K-1501; fittings removed and tank cleaned." Apparently related to this report is a recently discovered engineering drawing dated January 31, 1952, which provided details for a power supply from inside K-1035 to a gasoline pump island on the west side of K-1035 for lighting and operating the gasoline pump's 3/4 hp motor. The island pump base and outline of the gasoline storage tank are shown a few feet west of the concrete platform near column line 12, which places it near the center of the north/south run of the platform. The drawing, No. D-AWE 17103, is referenced below. Photographs reviewed to date have given little support to the location or time of operation of a gasoline station in the K-1401/K-1035/K-1036 area.

Waste Characteristics: Potential wastes are tetraethyl lead, ethylene dibromide and dichloride, sulphur, methyl and ethyl alcohol, xylene, toluene, benzene, and alpha-methyl naphthalene.

Release Data: Reliable information is not available on the disposition of any hazardous materials that may have been used at this unit.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Proposed Location of Underground Gasoline Storage Tank, Drawing No. OED-280, Ford, Bacon, and Davis Inc., December 5, 1944.

Power for Gasoline Pump and Light, Rev. 1, Drawing No. D-AWE-17103, Carbide and Carbon Chemicals Company, January 31, 1952.

Date Prepared: January 1993

Date Revised: June 1995

K/PH92-4069

K-1035 Gasoline Station

Unit Name: K-1037 Industrial Research Facility

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area, immediately west of the TSCA incinerator complex

Approximate Dimensions and Capacity: 820 × 400 ft; 30 ft tall; 334,225 ft² floor area

Dates Operated: 1945–87

Present Function: The building currently contains offices. Barrier manufacturing equipment has been secured.

Life Cycle Operation: K-1037 was originally a warehouse. The building later contained the barrier production facilities for all gaseous diffusion plants before production was discontinued in 1981. K-1037-C, an associated facility, contained a nickel smelter for processing barrier material and was operated 1954 to 1981. Offices for the AVLIS (Atomic Vapor Laser Isotopic Separation) program were later located in the building.

K-1037 is a steel-framed structure with reinforced concrete floors. The K-1037 complex is composed of a series of buildings and additions that were constructed at different times and joined under one roof. Transite siding covers the three outside walls of the eastern half of the building. Three outer walls of the western portion of the structure are covered with metal siding.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building surfaces and equipment

Comments: K-1037-C Smelter House is a subunit of this facility. This facility is also known as the K-1037 Barrier Plant and as the AVLIS building. There are classification concerns associated with this building.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Phase I Hazard Screening Analysis for the K-1037 Barrier Plant, HS/K-1037/PR/48.0/R0, March 1992.

Date Prepared: February 1995

K-1037 Industrial Research Facility

Unit Name: K-1037 Recirculating Cooling Water Lines

Unit Number: C003b

Project Status:

Unit Location: K-25 Site Main Plant Area, south of Portal

Approximate Dimensions and Capacity: 5200 gpm

Dates Operated: 1973–present for the K-822-A RCW lines. The K-822-B RCW lines were in use 1973–1974.

Present Function: Low-level use in air conditioning system for K-1037 Building

Life Cycle Operation: The K-822-A and -B cooling towers provided recirculating cooling water (RCW) for the K-1037 Barrier Plant until the plant was closed in 1981. Since that time, the K-822-A tower has been running at very reduced capacity for the K-1037 building air conditioning system. The K-822-B tower is inactive and has been disconnected from the RCW lines.

Waste Characteristics: The tower used chromated water from K-802 Pumphouse, which also supplied fire water for the entire Oak Ridge Gaseous Diffusion Plant. A chromate/zinc/phosphate treatment was used for corrosion control until 1977, when K-802 converted to a phosphate system. A pentachlorophenol fungicide treatment, which contains or degrades to traces of dioxin, may have been used on this system's cooling tower.

Release Data: No known releases

Site Status: The "A" tower portion of this unit is an active unit. The "B" portion RCW lines are under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: The cooling towers for this unit are addressed in a separate section.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K-1037 Recirculating Cooling Water Lines

Unit Name: K-1044 Heavy Equipment Repair Shop

Unit Number: C082

Project Status:

Unit Location: K-25 Site Main Plant Area, at the northeast corner of Building K-1225

Approximate Dimensions and Capacity: Approximately 250 × 60 ft

Dates Operated: Mid 1940s

Present Function: Building K-1225 now covers a portion of the area where the shop was once located.

Life Cycle Operation: Building T-18 was built in 1943 or 1944 as a heavy equipment repair shop by Ford Bacon and Davis during construction of the Oak Ridge Gaseous Diffusion Plant. The building included one or more grease racks, a paint shop and heavy equipment store. By 1945 the building designation had been changed to T-6, a number also used by a building to the north. In 1946 the southern building was redesignated as K-1044. In early 1947 Building K-1044 became a spare parts warehouse and was used for that purpose into the early 1950s. By July 1958 the building had been demolished.

Waste Characteristics: The following organic and lead contaminants are associated with vehicle maintenance facilities in the 1940s: gasoline, diesel fuel, lubricating oils, antifreeze, tetraethyl lead, ethylene dibromide and dichloride, sulphur and sulphur derivatives, methyl and ethyl alcohol, xylene, toluene, benzene, alpha-methyl naphthalene, naphthenes, aromatics, ethyl nitrate, isoamyl nitrate, acetone peroxide, paratone, acrylic esters, phosphites, tin salts; calcium, barium and other metallic soaps; passive sulphur-chlorine, lead-active sulphur, naphthenic lube oil, kerosene, turpentine, ethyl alcohol and ethylene glycol.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

Date Prepared: January 1993

Date Revised: June 1995

K-1044 Heavy Equipment Repair Shop

Unit Name: K-1045 Valve Shop

Unit Number: None

Project Status:

Unit Location: K-25 Site Centrifuge Area

Approximate Dimensions and Capacity: 720 ft²; 19 ft high

Dates Operated: 1982–85

Present Function: Centrifuge work has been discontinued. Activities currently carried out in K-1045 do not involve the production of hazardous wastes.

Life Cycle Operation: This building was originally built in 1943 as temporary building T-33-2 Boiler House as part of the Ford, Bacon, and Davis Construction Support Area. By early 1946, the building had been renumbered T-8. In 1947, the building was converted to an incinerator and had been renumbered K-1045. The building was used as an incinerator at least through 1951. Building directories from 1958, 1976, and 1978 list K-1045 as a storage building.

In 1982 the building was converted into a valve certification laboratory that was shut down in 1985. A rest room was added to the west end of the building in 1982. K-1045 is a one-story, concrete block building. The flooring and foundations are concrete. The built-up roofing is over a precast roof slab supported by I-beams and stran-type roof. The building has four through-the-wall air conditioners and two space heaters.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building interior

Comments: This unit is also known as the K-1045 Maintenance Office and Take Storage.

References:

Date Prepared: February 1995

K-1045 Valve Shop

Unit Name: K-1045-A Waste Oil Burning Pit

Unit Number: C129

Project Status:

Unit Location: K-25 Main Plant Area just south of the K-1010 west wall

Approximate Dimensions and Capacity: 11 × 19 ft (top dimensions) × 3 ft deep

Dates Operated: 1950s and 1960s

Present Function: A building air conditioning unit and large bush are located near the former location of the burn pit.

Life Cycle Operation: After discontinuation of the Old Firehouse Burn Area burn pit as a fire training area in the late 1940s, a concrete oil burning pit was installed northwest of building K-1045-A, located just west of the intersection of 5th Street and Boulevard Road. The pit was used for burning waste oil for fire training. There was a drain at the bottom of the pit that drained to an existing 24-inch drain line. Outfall is unknown, but judging by its location within the plant, it was probably to the K-1007-P1 pond. An existing drawing of the pit was made in 1954 and revised in 1958. The exact date that the pit was removed is uncertain.

Waste Characteristics: Initially, 55-gal drums of clean oil were burned. However, as time passed, other facility operations began disposing of oil by leaving unknown types of oil in unlabeled drums. The practice of burning unknown oils was stopped when it was determined that the spent oils may have contained hazardous materials.

Release Data: Releases of oil would have been through a drain line at the site that probably connected to the K-1004 Area Lab Drain.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Subsurface soil, groundwater

Comments:

References:

Waste Oil Burning Pit Plan and Details, Drawing No. D-S-24425A, Carbide and Carbon Chemicals Company, August 13, 1954, revised April 1, 1958.

Date Prepared: August 1994

Date Revised: June 1995

K-1045-A Waste Oil Burning Pit

Unit Name: K-1047 Motor Pool Repair Shop

Unit Number: C081

Project Status:

Unit Location: K-25 Site Main Plant Area, in the parking lot immediately north of the K-1007 Computer Center

Approximate Dimensions and Capacity: Approximately 250 × 50 ft

Dates Operated: 1940s

Present Function: The shop site is now completely covered by a parking lot.

Life Cycle Operation: J. A. Jones Construction built Building 628 in 1943 or 1944 to service personnel carriers during construction of the Oak Ridge Gaseous Diffusion Plant. In 1946 the building was redesignated as K-1047 and continued to be used as a motor pool repair shop. In 1948 Building K-1047 was converted to use as a lumber warehouse. By July 1958 the building had been demolished.

Waste Characteristics: The following contaminants are associated with vehicle maintenance facilities of the 1940s: gasoline, diesel fuel, lubricating oils, antifreeze, tetraethyl lead, ethylene dibromide and dichloride, sulphur and sulphur derivatives, methyl and ethyl alcohol, xylene, toluene, benzene, alpha-methyl naphthalene, naphthenes, aromatics, ethyl nitrate, isoamyl nitrate, acetone peroxide, paratone, acrylic esters, phosphites, tin salts; calcium, barium and other metallic soaps; passive sulphur-chlorine, lead-active sulphur, naphthenic lube oil, kerosene, turpentine, ethyl alcohol and ethylene glycol.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

Date Prepared: January 1993

Date Revised: June 1995

Unit Name: K-1048 Tire and Battery Shop

Unit Number: C079

Project Status:

Unit Location: K-25 Site Main Plant Area underneath the northernmost wing of the K-1007 Computer Center

Approximate Dimensions and Capacity: Approximately 70 × 70 ft

Dates Operated: 1940s

Present Function: The K-1007 Computer Center now covers the site of Building K-1048, which has been demolished.

Life Cycle Operation: The tire and battery shop was built in 1943 by J. A. Jones Construction Company and designated as Building 634. After being taken over by Carbide and Carbon Chemical Corporation, the building was redesignated as K-1048 in 1946. Existing records indicate that around that time, a new motor shop was planned to be added to the building, although no records exist to confirm that it was ever built. By 1951, the shop was no longer in use, and by July 1958 the building had been demolished.

Waste Characteristics: Wastes associated with a battery shop are lead and sulfuric acid. Wastes from cleaning operations associated with a motor shop would likely have included carbon tetrachloride, oils, resins, xylene, toluene, mineral spirits, Melamine, acetone, varnishes and lacquers.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

Date Prepared: January 1993

Date Revised: June 1995

Unit Name: K-1050 Wash, Grease and Paint Shop

Unit Number: C080

Project Status:

Unit Location: K-25 Site Main Plant Area, north of the K-1007 Computer Center immediately outside the building's perimeter fence at groundwater monitoring well BRW-43

Approximate Dimensions and Capacity: Approximately 80 × 150 ft

Dates Operated: 1943–61

Present Function: The shop has been demolished and completely paved over.

Life Cycle Operation: This facility was originally built in 1943 and designated as Building 640 by J. A. Jones Construction Company. The facility was used to wash and lubricate motorized fleet equipment to minimize undercarriage damage. By 1946, the building had been redesignated as K-1050. Work orders indicate that a paint shop was included in the building and that a brake tester, waste oil storage tank and drain lines were planned. However, records do not confirm whether or not the brake tester and waste oil facilities were ever installed.

Waste Characteristics: Potential contaminants associated with 1940s vehicle greasing and washing operations include paratone, acrylic esters, phosphite, sulphur derivative, tin salts; calcium, barium and other metallic soaps; passive sulphur-chlorine, lead-active sulphur and naphthionic lube oil. Wastes associated with a 1940s paint shop would likely have included compounds of chromium, zinc, titanium, antimony, aluminum, copper, cadmium, gold, zinc, cobalt manganese, iron, calcium and lead. Organic compounds would have included phenolic and petroleum resins, aromatic acids, urea, melamine, nitrocellulose lacquers, polystyrene, styrene, acrylate, allyl, silicone, turpentine, petroleum-based thinners, butyl acetate, butyl alcohol, ethyl acetate, ethyl alcohol, toluene, naphtha and naphthenates of copper, zinc and mercury.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

Date Prepared: January 1993

Date Revised: June 1995

113-2

K-1050 Wash, Grease and Paint Shop

Unit Name: K-1052 Advanced Machine Development Lab

Unit Number:

Project Status:

Unit Location: K-25 Site Centrifuge Area

Approximate Dimensions and Capacity: 11,200 ft²

Dates Operated: 1974–85

Present Function: Inactive

Life Cycle Operation: K-1052 is a multi-use, multi-purpose facility formerly designated the Advanced Machine Development Laboratory (AMDL). The building was completed in 1974 as part of the gas centrifuge project to aid in the development of high-speed rotating hardware in support of the gas centrifuge program, assembly and testing of individual full-sized gas centrifuges, and high-speed balancing of fully assembled units.

This building is constructed of steel beams on a concrete slab with insulated metal siding. K-1052 consists of a high bay that is now empty except for a few metal cabinets and an elevated control room. Access to the mezzanine is by two sets of metal stairs. Cabinets on the east side of the bay beneath the control room were roped off as a radiation control zone. An office area with a break room adjoins the high bay on the west side. Beneath the ground floor level of the high bay is a lighted basement roped off and posted as a confined space. Access to the pit is chained and posted as a confined space and radiological area.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases to the environment

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building interior and equipment

Comments: For Decontamination and Decommissioning purposes, K-1004-N1 cooling tower is considered a subunit of this facility. There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K-1052 Advanced Machine Development Lab

K/PH95-2418

Unit Name: K-1055 Gasoline/Diesel Station

Unit Number: C089

Project Status:

Unit Location: K-25 Site Main Plant Area, outside the perimeter fence on the east side of Avenue J west of buildings K-1003 and K-1006

Approximate Dimensions and Capacity: One underground fuel tank (Oil Tank K-1076) with dimensions 26 ft long by 6 ft diameter served the station. The capacities of other tanks that may have existed at the site are unknown.

Dates Operated: 1940s

Present Function: The K-1055 station has been removed, and no other facilities have been built at that location.

Life Cycle Operation: The K-1055 Station was in use as early as 1944 as a gasoline station for the Oak Ridge Gaseous Diffusion Plant construction operations. In 1948 plans were completed to install an underground storage tank for dispensing diesel oil, although no records have been found confirming that this tank was installed. No precise information is available on when the station was shut down and cleared of temporary buildings. The number and location of tanks has not been determined, nor whether or not any of the tanks were removed.

Waste Characteristics: Potential contaminants from gasoline used in the 1940s are tetraethyl lead, ethylene dibromide and dichloride, sulphur, methyl and ethyl alcohol, xylene, toluene, benzene, and alpha-methyl naphthalene. Contaminants from 1940s diesel fuel include naphthenes, aromatics, sulphur, ethyl nitrate, isoamyl nitrate and acetone peroxide.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Diesel Oil Dispensing Station, Building K-1055, Drawing No. AWP6188, Rev. 0, Carbide and Carbon Chemicals Company, October 13, 1947.

K-1065 and Diagonal Road, Fence Lighting Grounding and Street Lighting, Drawing No. AWE-6592, 2, Carbide and Carbon Chemicals Company, April 9, 1948.

Diesel Oil Dispensing Station, Building K-1055, Drawing No. C-AWE-6557, 2, Carbide and Carbon Chemical Company, April 9, 1948.

Date Prepared: January 1993

Date Revised: June 1995

K-1055 Gasoline/Diesel Station

Unit Name: K-1064 Drum Storage and Burn Area

Unit Number: R007

Project Status:

Unit Location: K-25 Site Process Plant Area northwest of K-801-H Cooling Tower Basin on a peninsula formed by a meander of Poplar Creek

Approximate Dimensions and Capacity: Three acres. There is no distinct boundary between this unit and the rest of the peninsula area.

Dates Operated: 1950s-1979

Present Function: The area is a grassy field, and there are no drums present. There is an old decontamination pad and sump located in the area. There is a trailer currently located on the south side of the unit.

Life Cycle Operation: Open burning of waste solvents took place in a tepee incinerator on this site during the 1950s. From 1960 to 1979 the area was used for drum storage of waste solvents. At closure in 1979, all drums were removed.

Waste Characteristics: Wastes burned at the site include waste paints, organic wastes and radiological contaminated waste oils. Wastes stored include solvents, organics including PCBs, waste wood including cooling tower wood, and radioactively contaminated waste oils. Records indicate that 1838 drums with a total capacity of 90,000 gallons were stored at the facility prior to discontinuing drum storage in the area.

There is evidence of chemical soil contamination from organics and metals, and the area has been roped off. A radiological contamination area has also been roped-off and posted. A radiation survey conducted in FY 1994 expanded the previously identified contamination area. Sampling for PCBs at this unit found them to be below the TSCA action limit of 50 ppm.

In 1992, maintenance personnel discovered solid refuse scattered along a stretch of the west bank of Poplar Creek outside the K-1064 area's security fence. Refuse includes glass containers, steel plates, transite siding and corrugated galvanized waste cans. This debris may be left over from K-1064 activities or may be a continuation of the K-25 North Trash Slope discussed elsewhere in this document.

Release Data: Elevated levels of alpha, beta, and gamma contamination have been detected at this unit.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments:

References:

RCRA Facility Investigation Plan, K-1064 Burn Area/Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, Martin Marietta Energy Systems, Inc., July 1987.

K-1064 Burn Area/Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, 1, Martin Marietta Energy Systems, Inc., May 1989.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

K-25 Site Photo No. 69-484C, Martin Marietta Energy Systems, Inc., 1969.

K-25 Site Photo No. 79-414, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, 1979.

S. G. Thornton, *General Background Information on K-1064-C Drum Cleaning Facility*, K/EM-98, Part 8, Environmental Management Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Oak Ridge, Tennessee, March 6, 1995.

Date Prepared: April 1987

Date Revised: April 1995

K/PH87-0603

K-1064 Drum Storage and Burn Area

Unit Name: K-1064-G Drum Deheading Facility

Unit Number: R020

Project Status:

Unit Location: K-25 Site Main Plant Area, northwest of K-801-H Cooling Tower Basin on a peninsula formed by a meander of Poplar Creek

Approximate Dimensions and Capacity: 75 × 50 ft plus a 1000-gal capacity underground storage tank

Dates Operated: 1970–1979

Present Function: The tank has been removed, and there are no signs of contamination in the surface soil.

Life Cycle Operation: This unit was used for storage of waste liquids from used drums. The residual quantities of various solvents and aqueous materials were poured from 55-gal drums in order to remove the tops from the drums so they could be used to store other materials.

Waste Characteristics: Waste oils and solvents

Release Data: There have been no known releases from this unit. Material in the underground tank was removed. In the summer of 1986, samples were taken of the soil around the tank and of water in the tank and analyzed according to the EP Toxicity Procedure. Results indicated that the soil surrounding the underground storage tank was not contaminated during operation of this facility. The tank was removed.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: None

Comments: This unit is associated with the K-1064 Drum Storage and Burn Area.

References:

RCRA Facility Investigation Plan, K-1064 Burn Area/Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, Martin Marietta Energy Systems, Inc., July 1987.

K-1064 Burn Area/Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, 1, Martin Marietta Energy Systems, Inc., May 1989.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

S. G. Thornton, General Background Information on K-1064-C Drum Cleaning Facility, K/EM-98, Part 8, Environmental Management Division, Oak Ridge K-25 Site, Martin Marietta Energy Systems, Oak Ridge, Tennessee, March 6, 1995.

Date Prepared: April 1987

Date Revised: April 1995

Unit Name: K-1066-B Cylinder Storage Yard

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area, north of K-1036

Approximate Dimensions and Capacity: 50,600 ft²

Dates Operated: 1971–present

Present Function: Storage of approximately 425 UF₆ cylinders

Life Cycle Operation: This unit was placed in operation to provide for interim storage and handling of UF₆ product and feed cylinders. Part of the storage yard is built over the K-1070-B Old Classified Burial Ground. The cylinder yard pad is approximately 6 inches deep.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This is an active unit.

Media of Concern: Pad, soil and groundwater

Comments: This facility is part of the Decontamination and Decommissioning Program.

References:

Phase I Hazard Screening Analysis for K-1066-B Cylinder Storage Yard, HS/K-1066B/PK/51.1/R0, March 1992.

Date Prepared: May 1995

K-1066-B Cylinder Storage Yard

Unit Name: K-1066-E Cylinder Storage Yard

Unit Number:

Project Status:

Unit Location: K-25 Site Process Plant Area, northwest of K-27

Approximate Dimensions and Capacity: 167,637 ft²

Dates Operated: 1971–present

Present Function: Storage of approximately 2000 UF₆ cylinders

Life Cycle Operation: This unit was built to provide long-term storage of UF₆ cylinders. A six-inch concrete pad covers approximately one acre of K-1066- E. The remainder of the area is a gravel surface. The northern boundary of the cylinder yard, adjacent to Poplar Creek, is protected by a security fence.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This is an active unit and is part of the Decontamination and Decommissioning Program.

Media of Concern: Pad, soil and groundwater

Comments:

References:

Phase I Hazard Screening Analysis for K-1066-E Cylinder Storage Yard, HS/K-1066E/PK/53.1/R0, March 1992.

Date Prepared: February 1995

K-1066-E Cylinder Storage Yard

Unit Name: K-1066-J Cylinder Storage Yard

Unit Number:

Project Status:

Unit Location: North of Building K-25, near Poplar Creek

Approximate Dimensions and Capacity: 62,600 ft²

Dates Operated: 1975–present

Present Function: Approximately 450 UF₆ cylinders with approximately 1000 smaller, empty cylinders

Life Cycle Operation: This unit was created for the long-term storage of UF₆ cylinders. The surface is gravel. Before being used as a cylinder yard, it was a trash dumping area.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This is an active unit and is part of the Decontamination and Decommissioning Program.

Media of Concern: Pad, soil, groundwater

Comments: This unit covers a portion of the area reported elsewhere as the North Trash Slope.

References:

Phase I Hazard Screening Analysis for K-1066-J Cylinder Storage Yard, HS/K-1066B/PK/54.1/R0, March 1992.

Date Prepared: February 1995

**K-1066-J
Cylinder
Storage Yard**

**K-25 Site
North Trash
Slope**

**K-1025-E
Warehouse**

K-1066-J Cylinder Storage Yard

Unit Name: K-1066-K Cylinder Storage Yard

Unit Number:

Project Status:

Unit Location: K-25 Site External Plant Area, east of K-33

Approximate Dimensions and Capacity: 80,652 ft²

Dates Operated: 1981–present

Present Function: Storage of approximately 2950 UF₆ cylinders. A portion of the yard has been used as foundation for five K-1065 hazardous waste storage buildings.

Life Cycle Operation: This unit was put in service in 1981 to provide for long-term storage of UF₆ cylinders. The northern portion of the pad was used in 1992–93 for construction of the large waste management storage buildings. This unit has a 6-in. concrete pad.

Waste Characteristics: Uranium

Release Data: The cylinder yard is roped off as a radioactivity contamination area.

Site Status: This is an active unit and is part of the Decontamination and Decommissioning Program.

Media of Concern: Pad, soil, groundwater

Comments:

References:

Phase I Hazard Screening Analysis for K-1066-B Cylinder Storage Yard, HS/K-1066B/PK/51.1/R0, March 1992.

Date Prepared: February 1995

K/PH93-0582

K-1066-K Cylinder Storage Yard

Unit Name: K-1070-A Landfarm

Unit Number: C104

Project Status:

Unit Location: K-25 External Plant Area in the west of the K-33 Building, immediately south of the K-1070-A Old Contaminated Burial Ground. The road to the burial ground marks a Y. Landfarming of Fuller's Earth was done about 100 yards down the west branch.

Approximate Dimensions and Capacity: Approximately 1.5 acres

Dates Operated: 1979-1985

Present Function: The area is covered with grass and other vegetation.

Life Cycle Operation: Between 1979 and 1985, approximately 190,000 gal of diffusion cascade lubricating oil from the K-33 diffusion process was recycled using 5000 cubic feet of Fuller's Earth as a filter aid. The Fuller's Earth served to remove concentrated acids, sludges, and other degradation products from the cascade oil. Once saturated, the Fuller's Earth was applied to the surface of the K-1070-A Landfarm.

Waste Characteristics: Fuller's Earth is composed of a naturally occurring clay to which metals, oils, and organic compounds adhere. Before being applied to the K-1070-A landfarm, the Fuller's Earth was sampled and analyzed for PCBs and was not used unless the analysis indicated a concentration less than 5 ppm.

Release Data: To determine the levels of other possible contaminants, samples from the K-1070-A Landfarm were analyzed for total petroleum hydrocarbons, total inorganic elements, and semivolatile organics. The analyses indicated that all levels of these are less than or equal to, or below background levels, or less than health-based guideline values.

Site Status: A preliminary assessment site inspection has been conducted for this unit. Results of the study indicate that the site poses no risk to human health or the environment; consequently no further action should be taken to characterize the site. This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil

Comments:

References:

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Remedial Investigation Work Plan for the K-901 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR-1052/D2 (4 volumes), Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, February 1993.

Date Prepared: Soil

Date Revised: June 1995

K-1070-A Landfarm

Unit Name: K-1070-A Old Contaminated Burial Ground

Unit Number: R001

Project Status: CERCLA

Unit Location: K-25 Site External Plant Area, west of K-33

Approximate Dimensions and Capacity: 0.2 acre surface area with 62 graves of an average depth of 11.5 ft. Trenches measure $11 \times 3 \times 108$ ft; auger holes were 12×3 ft.

Dates Operated: Late 1940s through March 1976

Present Function: Waste disposals have been discontinued. A fence has been placed around the burial ground to limit public access.

Life Cycle Operation: This burial ground was used for disposal of low-level contaminated waste and mixed chemical waste. Although previously released reports indicated that a four-foot soil cap was placed over the entire burial ground, subsequent investigations have revealed that this four-foot layer applies only to the top of each individual grave. Since entering the Inactive Waste Sites Surveillance and Maintenance Program, soil has been brought in to cover subsistence and groundhog holes. New burial markers were put in place in 1994.

Waste Characteristics: Extensive and detailed documentation exists for the type and location of wastes buried at K-1070-A. Wastes include MFL oil and a wide range of metals, including thorium, lead and uranium. Much of the material, including scrap metal, empty barrels, and leached Al_2O_3 , is contaminated with uranium. Vent pipes are visible on the site where pyrophoric materials are thought to have been buried.

An obvious radiological plume composed almost entirely of beta activity is present in the groundwater underlying the site. Mean gross alpha exceeding 15 pCi/L occurred at only two monitoring wells, UNP-15 (19 pCi/L) and UNW-32 (24 pCi/L). However, gross beta was found to exceed 50 pCi/L at six wells (UNP-12, UNP-14, UNP-15, UNW-31, BRW-6 and BRW-25) at levels as high as 836 pCi/L. A plume of organic solvents in groundwater has also been described at the site; the main contaminant is trichloroethene.

Release Data: A soil sampling program conducted in 1989–1990 indicated that there has been no migration of contamination through the soil. Groundwater monitoring samples indicate that there has been leakage into the groundwater beneath the site.

An abundance of cavities and caves are known to exist in this area. Drilling during Remedial Investigation field activities has resulted in the discovery of numerous cavities and fractures ranging in size from 2 to 22 ft in six of eight bedrock wells drilled to date. Some of these cavities are empty, while others are filled with mud, water, or both.

Hazardous and radioactive wastes have been placed in the burial ground above karst terrain with known caverns. Because of these subsurface conditions, the stability of the burial ground is questionable, and portions may be subject to potential collapse.

Site Status: A remedial investigation is currently being performed for this unit.

Media of Concern: Groundwater

Comments:

References:

Focused Sampling and Analysis Plan for the K-901-A Holding Pond and K-1070-A Burial Ground at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1052/V2&D3, Martin Marietta Energy Systems Inc., Oak Ridge, Tennessee, September 1994.

Remedial Investigation Work Plan for the K-901 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR-1052/D2 (4 volumes), Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, February 1993.

RCRA Facility Investigation Plan, K-1070-A Contaminated Burial Ground, ORGDP, Oak Ridge, Tennessee, K/HS-133, 1, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, May 1989.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

K-25 Site Environmental Restoration Program, Site Characterization Summary, K-1070-A Contaminated Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-3/D1, DRAFT, issued for comment March 1990.

K-25 Site Environmental Restoration Program, Work Plan: Quality Assurance/Quality Control Health and Safety Plan for the Site Characterization of K-1070-A, K/ER-5, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1990.

K-25 Site Environmental Restoration Program, Field Observation Report for K-1070-A Contaminated Burial Ground RCRA Facility Investigation, K/ER-7, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1990.

K-25 Site Environmental Restoration Program, Data Evaluation Technical Memorandum on the K-1070-A Contaminated Burial Ground, Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-42, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, April 1991.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

K-25 Site Photo No. K/PH 72-1500, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, 1972.

K-25 Site Photo No. K/PH 72-1501, Lockheed Martin Energy Systems, Oak Ridge, Tennessee, 1972.

Date Prepared: April 1987

Date Revised: June 1995

K/PH93-6338

K-1070-A Old Contaminated Burial Ground

Unit Name: K-1070-B Old Classified Burial Ground

Unit Number: R002

Project Status:

Unit Location: K-25 Site Main Plant Area, west of K-25 Building, north of K-1407 Maintenance Building, east of K-1407-B Holding Pond

Approximate Dimensions and Capacity: 3.7 acres; estimated average depth of 30 ft with 2.5 ft soil cover

Dates Operated: Early 1950s to 1976

Present Function: This unit is covered with grass, small shrubs, and trees.

Life Cycle Operation: This unit was used for disposal of a wide variety of wastes, including numerous truckloads of material from the "Y" burial ground at the intersection of State Routes 58 and 95. Equipment included compressor and coolant equipment from the S-50 Plant and old K-25 Power House. In 1969 large amounts of obsolete equipment from the Barrier Plant were buried at the 1070-B Burial Ground.

The burial ground grew outward from the side of an existing hill south of K-1700 (Mitchell Branch) Stream. As more wastes were disposed of and covered, the elevation for more and more of the creek bottomland grew to be flush with the elevation of the K-1300 complex. As a result, a portion of the burial ground is located on top of the former K-1218 Coded Chemicals Storage Facility.

Waste Characteristics: The burial ground received classified nonhazardous and potentially hazardous materials such as hardware and equipment. Lead, uranium, aluminum, copper, beryllium, lead, bronze, and brass are among metals buried at this unit. Asbestos is also present. Contamination from liquid organics or hydrocarbon oils is thought to be minimal.

Release Data: High-level radioactive material and surrounding dirt was reportedly cleaned from an area southeast of the burial ground in the mid-1970s.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: The K-1066-B cylinder storage yard and K-1045-A Fire Training Facility are located on the ground above this facility. There are classification concerns associated with this site.

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: March 1995

K-1070-B Old Classified Burial Ground

Unit Name: K-1070-C/D Classified Burial Ground

Unit Number: R005

Project Status: CERCLA

Unit Location: K-25 Site Main Plant Area, on a hill between the centrifuge area and K-1037

Approximate Dimensions and Capacity: 22 acres; 12 acres active burial area. The C portion of the burial ground is an approximately 300 × 300 ft area. The larger D portion contained three large trenches measuring 20 × 20 × 300 ft, and 8 pits, each approximately 20 × 10 × 20 ft deep.

Dates Operated: 1974–1989

Present Function: Aboveground storage of nonhazardous and nonradioactive construction rubble and native soil excavated from plant construction projects.

Life Cycle Operation: Burial of classified equipment, oils, glass, and contaminated scrap metal. The K-1070-C area began accepting waste in January 1975 and continued through 1977. The K-1070-D area began accepting classified waste into a 20 × 20 × 300 trench. By May 1977 the first of three large trenches had been opened. Trenches ran north to south and were dug side by side with A the easternmost and C the westernmost trench. Trenches were backfilled from north to south. Information from aerial photographs shows that by 1979 trench A had been closed, by 1983 trench B was worked to midpoint, and in fall 1988 trench C was being worked. The burial ground stopped receiving wastes in July 1989, and by November 9, 1989 the trenches were all filled and leveled.

Ten pits existed near the southwest boundary of the burial ground. A 1977 letter breaks these pits down into the following areas: A received materials and containers with strong oxidizing agents; B received clean glass and plastic containers; C received routine, nonhazardous, nonradioactive classified materials; D received radioactively contaminated materials; F received materials and containers of strong reducing agents; G received highly volatile compounds, such as organic solvents; and H pit received pesticides.

A drum compactor (K-1071) was located on the A trench portion of the burial ground. The concrete pad for the unit is still in place.

Dust suppression landfarming was carried out with 4450 gal of oil in 1982 and 2000 gal in 1983. The 1982 oil was spread in the vicinity of the dirt road triangle leading to Dike Number 2; this oil was free of uranium, had chlorinated hydrocarbon content below 1 percent and PCB content less than 5 ppm. The 1983 oil contained relatively high levels of uranium and was landfarmed in an area near C trench, which was being used at the time. When it was assumed that the oil had been biodegraded by microorganisms, the dirt was scraped off and buried in C trench.

Waste Characteristics: Approximately 9100 gal of solvents and 1600 lb of chemicals were disposed of in the pits. Lead and uranium are among metals buried in the burial ground's trenches.

In 1993 the K-1071 pad was upgraded from contaminated to highly contaminated. The residuals present on the pad were considered loose and transferrable. The pad area was covered and sandblasted to prevent further contamination, and a diversion dike was built to prevent surface water from washing over the unit.

Release Data: SW31 Spring, which surfaces near the burial ground, has shown detectable concentrations of volatile organic compounds.

Site Status: Field work for an RI was completed in 1994, and an RI report is in draft form. This unit is currently under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Groundwater and soil

Comments: There are classification concerns associated with this unit.

This unit contains the following subunits: K-1070-C burial ground, K-1070- D trenches, K-1070-D pits, K-1071 concrete pad.

References:

Phase 2 Remedial Investigation Work Plan for the K-1070-C/D Contaminated Burial Ground at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Volume 1: History, Environmental Characterization, and Project Scope, DOE/OR-1025, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, April 1992.

RCRA Facility Investigation Plan, K-1070-C/D Classified Burial Ground, ORGDP, Oak Ridge, Tennessee, K/HS-140, 1, Martin Marietta Energy Systems, Inc., May 1989.

K-25 Site Environmental Restoration Program, Work Plan: Quality Assurance/Quality Control Health and Safety Plan for the Site Characterization of K-1070-C/D, K/ER-6, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1990.

Data Evaluation Technical Memorandum on the K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-40, Martin Marietta Energy Systems, Inc., October 1991.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Preliminary Description of K-1070 C/D Classified Burial Ground, Martin Marietta Energy Systems internal correspondence from R. G. Bugos to Patty Goddard, K-25 Environmental Restoration Program Project Manager, July 18, 1994.

Aerial Photo No. K/PH 79-256, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, 1979.

Date Prepared: April 1987

Date Revised: June 1995

K-1070-C/D Classified Burial Ground

ORO79-811

K-1070-C/D Classified Burial Ground (Pits Area)

Unit Name: K-1070-D1, D2, and D3 Storage Dikes

Unit Number: R026

Project Status: 3004.u, CERCLA

Unit Location: K-25 Site Main Plant Area on the east side of the K-25 site, on top of the K-1070-C/D burial ground

Approximate Dimensions and Capacity: Dike D1 covered 0.15 acres, Dike D2 covered 0.26 acres, and Dike D3 covered 0.21 acres. The storage total for all dikes was 912 drums.

Dates Operated: November 1980–April 1985

Present Function: Closed

Life Cycle Operation: Contaminated waste liquids were stored within these earthen dikes. D2 was the “working” dike where drums of wastes were sampled. If the oil was clean (less than 10 percent solvent, and within acceptable levels of PCBs), it was landfarmed on gravel roads around the K-25 Site for dust control. In preparation for landfarming, oil was poured into a large tank, made of the end of converter shell, 3 ft deep, 8 ft diameter. Drums would be poured into this tank, and when the tank was almost full, a diaphragm pump sent the oil into a tanker. A drum with unacceptably high levels of PCB or uranium went to D1 and D3 dikes for storage. At the end of operations, all waste drums were removed, and the dikes were accepted as closed by state regulators in 1986.

Waste Characteristics: A total of 856 drums were stored. Wastes included the following: trichloroethane, ethylene glycol, gasoline, methylene chloride, varsol, freons, isopropyl alcohol, Dearborn 537, perchloroethylene, Cimcool, acetone, xylene, Rust Ban, trollyl triazole, tributyl phosphate, dioctyl phthalate, sulfonic acid, ethyl alcohol, hexane, penta-ether, Nutek, degreaser residue, garage wash rack sludge, various waste oils and solvents, paint waste, and classified liquids and oils. PCBs and uranium were present in some of the drums of waste.

Release Data: Clean (PCB and uranium within acceptable limits) oil is known to have been spilled at the D2 dike during transfer operations. Incidents of leaks from other drums have also been reported.

Site Status: The closure plan for these dikes required a non-RCRA cap and revegetating the area. The units have also been reevaluated as part of the K-1070-C/D Remedial Investigation. This unit is currently under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: Dikes D1, D2, and D3 were also known as Dikes A, B, and C, respectively.

There are classification concerns associated with this unit.

References:

RCRA Facility Investigation Plan, K-1070-C/D Classified Burial Ground, ORGDP, Oak Ridge, Tennessee, K/HS-140, 1, Martin Marietta Energy Systems, Inc., May 1989.

K-25 Site Environmental Restoration Program, Work Plan: Quality Assurance/Quality Control Health and Safety Plan for the Site Characterization of K-1070-C/D, K/ER-6, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1990.

Data Evaluation Technical Memorandum on the K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-40, Martin Marietta Energy Systems, Inc., October 1991.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Preliminary Description of K-1070 C/D Classified Burial Ground, Martin Marietta Energy Systems internal correspondence from R. G. Bugos to Patty Goddard, K-25 Environmental Restoration Program Project Manager, July 18, 1994.

Letter from Tom Tiesler, Director of TDHE Division of Solid Waste Management, to William F. Manning, Director DOE Enriching Operations Division, Re: Closure of Hazardous Waste Storage Facility K-1070-D1, D2, and D3, TN4 89 009 0018, November 20, 1986.

Letter from William F. Manning, DOE Director of Enriching Operations Division, to Jack E. Ravan, EPA Region IV Administrator, and Tom Tiesler, TDHE Solid Waste Management Division Director, RCRA Closure Certification—K-1070-D1, D2, and D3 —Oak Ridge Gaseous Diffusion Plant (ORGDP), October 14, 1986.

Letter from J. G. Rogers, ORGDP Environmental Coordinator, to H. W. Hibbits, DOE-ORO Environmental Protection Division Director, K-1070-D1, D2, and D3 Closure Certification, September 17, 1986.

Jesse L. Hicks, *Certificate of Closure*, IT Corp., Knoxville, Tennessee, September 3, 1986.

Letter from Tom Tiesler, TDHE Solid Waste Management Division Director, to James L. Foutch, DOE-ORO Assistant Manager for Defense Programs, Re: Closure of Hazardous Waste Storage Facility, K-1070-D1, D2, and D3, TN4 89009 0018, May 12, 1986.

Martin Marietta Energy Systems Internal Correspondence from S. G. Perkins to T. A. Bowers, Re: Sampling Plan for Waste Storage Dikes, May 2, 1985.

Closure Plan for the Dike Drum Areas K-1070-D1, D2, and D3, 1, Martin Marietta Energy Systems, Oak Ridge, Tennessee, November 1, 1985.

Aerial Photo No. K/PH 79-811, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, 1979.

Date Prepared: April 1987

Date Revised: June 1995

K/PH87-0719

K-1070-D1, D2, and D3 Storage Dikes

K/PH87-0739

K-1070-D1, D2, and D3 Storage Dikes

K/PH87-0840

K-1070-D1, D2, and D3 Storage Dikes

Unit Name: K-1070-F Construction Spoil Area

Unit Number: R018

Project Status:

Unit Location: K-25 Site External Plant Area, on a peninsula near the confluence of Poplar Creek and the Clinch River

Approximate Dimensions and Capacity: Approximately 5 acres

Dates Operated: Early 1970s to 1978

Present Function: Inactive

Life Cycle Operation: Burial of general construction and demolitions rubble. The area was not approved for disposal of hazardous materials. In 1984, approximately 51 borings were made in the area and are described in the Geotek report referenced below.

Waste Characteristics: Cooling towers material; concrete; roofing scrap; soil, asphalt, dirt and rock from pit excavations and water line breaks; clean scrap; building materials; asbestos, transite; skids and pallets; cross ties; glass, paper, Fuller's Earth filter compound. There is no evidence that hazardous or radioactive constituents were buried at this unit. However, detailed records are not available for the materials buried in the early 1970s.

Release Data: No known releases

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Groundwater

Comments: This unit is also known as the K-1070-F Old Contractors Burial Ground.

References:

RCRA Facility Investigation Plan, K-1070-F Old Contractors Burial Ground, ORGDP, Oak Ridge, Tennessee, K/HS-146, Martin Marietta Energy Systems, Inc., December 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Geotek Engineering Company, Geotechnical Investigations for the Proposed Torroidal Fusion Core Facility for K-25 Plant, MMES Order No. 8613-47970V, Release No. K-25, June 30, 1994.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K-1070-F Construction Spoil Area

Unit Name: K-1070-G Burial Ground

Unit Number: R054

Project Status:

Unit Location: K-25 Site Main Plant Area, southwest of K-1700 Stream, northeast of Portal 6, outside the K-25 Site perimeter fence.

Approximate Dimensions and Capacity: 300 × 200 ft. Because this was never an official burial area, there are no definite boundaries other than visible rubble. Approximate boundaries to the east, south, and west area invisible below the grassy cover. Signs posted at three outfalls (SDD 144, 142, and 140) adjacent to the stream help to identify the site.

Dates Operated: 1943–1950s

Present Function: Inactive. The surface area slopes gently toward the adjacent creek and consists of thick grass that is regularly mowed in summer.

Life Cycle Operation: The site was never a designated or authorized burial ground. Although no well-documented sources are available on this site, interviews with personnel familiar with operations in this area reveal that Maxon Construction Co. had a material storage area south of the K-1700 Stream during the 1940s and early 1950s. Periodically, debris from this storage area was bulldozed over the embankment toward the stream. The area north of the K-1700 Stream was the site of a hutment community that housed construction workers in the mid to late 1940s, and this hutment community may have contributed to some of the refuse at the area. A campsite for construction workers was located on the site during World War II, but there are no signs that a gas filling station, oil storage area or equipment service facility existed at the site. The area was later covered and graded to its present contours and seeded with pine trees in the 1950s.

Waste Characteristics: The contents of the burial ground are unknown. Surface materials indicate construction rubble and pipe, asphalt, a transformer (no PCBs detected), sheet metal, old signs, metal culvert scrap, wooden pallets, concrete posts, railroad ties, iron pipe, and steel beams. A radiological survey in FY 1994 found no indications of hazardous waste.

Release Data: No known releases

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments:

References:

RCRA Facility Investigation Plan, K-1070-G Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-152, Martin Marietta Energy Systems, Inc., May 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: June 1995

K-1070-G Burial Ground

Unit Name: K-1085 Old Firehouse Burn Area

Unit Number: R043

Project Status:

Unit Location: K-25 Site External Plant Area. The burn pit is located outside the K-25 Site perimeter fence within an area bounded by SR 58, East Gallaher Road, and Powerhouse Road. The foundation of the old firehouse itself is located just southeast of the Bear Creek Road extension at its convergence with Powerhouse Road.

Approximate Dimensions and Capacity: The pit had dimensions estimated at $20 \times 25 \times 15$ ft. The location of the former pit has been narrowed to an approximately 2-acre area. The location of the old firehouse has been identified and covers an approximately 60×20 ft area.

Dates Operated: 1944–1960

Present Function: The pit area was regraded when the Bear Creek Road extension was built in the 1960s. All that remains of the old firehouse is a concrete pad in the woods.

Life Cycle Operation: An existing farmhouse on site was converted to a fire hall in 1944 and served as such until 1951. A fuel station and garage were also used on the site 1944–47. Waste oil was burned in an unlined pit until 1951, when the pit was filled. Open burning of contaminated oil took place in large metal pans on the concrete pads of the three buildings until 1960.

Waste Characteristics: Exact details of the types and quantities of waste burned at this unit are unknown. Available information indicates various waste solvents such as trichloroethylene, acetone, perchloroethylene, carbon tetrachloride, tetrachloroethylene, methyl chloride, PCB-contaminated oil and paint wastes were burned in an open container at the unit. A rough 1990 estimate of the amount of oil burned in the pit is 95,000 gal.

Release Data: The waste-handling operations at this unit were not controlled. Pit burning was extinguished with water at the end of each day, and water was periodically pumped from the pit. Water was pumped with a portable gasoline driven pump onto the ground or road, which sloped downhill from the pit.

Groundwater has been monitored from five wells in the nearby area. No contaminants have been found to date above background levels.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments:

References:

Remedial Investigation Work Plan for the K-770 Operable Unit at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1157 & D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, July 1994.

RCRA Facility Investigation Plan, K-1085 Firehouse Burn Area, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-149, Martin Marietta Energy Systems, Inc., August 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K/PH95-2377

K-1085 Old Firehouse Burn Area

Unit Name: K-1092 Tank Foundation

Unit Number:

Project Status: Powerhouse Area Project

Unit Location: K-25 Powerhouse Area, between K-707 and the railroad tracks

Approximate Dimensions and Capacity: Diked area approximately 3000 ft²

Dates Operated: 1950s–1960s

Present Function: Abandoned

Life Cycle Operation: This unit was a diked area for four fuel oil tanks used for Powerhouse operations, which were shut down in 1962.

Waste Characteristics: Fuel oil

Release Data: No known releases

Site Status: This facility has been partially demolished and is awaiting removal as part of the Powerhouse Area Project

Media of Concern: None

Comments: This unit is also known as the K-1092 diked area. There is no photo for this area.

References:

Date Prepared: June 1995

K-1092 Tank Foundation

Unit Name: K-1098-C Asphalt Plant

Unit Number: K-C115

Project Status:

Unit Location: K-25 Site Main Plant Area, originally located west of the K-1501 Steam Plant at 11th Street and Avenue C. The Second Plant was located north of 14th Street near the K-1407-A Neutralization Pit.

Approximate Dimensions and Capacity: 50 × 8 × 12 ft high; 22,400-gal asphalt emulsion tank for the first plant; the same tank was moved to the second plant.

Dates Operated: Exact operation dates are unknown. The first plant was in operation from 1947 to 1953–54; the second approximately 1954 to the 1960s.

Present Function: The plants have been removed.

Life Cycle Operation: The first K-1098-C asphalt plant was a hot-mix operation. Equipment for the mixing plant was salvaged from the J.A. Jones Asphalt Plant located on Roundhouse Road near the Southern Railway Yard. The second K-1098-C was a cold-mix plant located north of 14th Street.

Waste Characteristics: Asphalt constituents include petroleum oils, kerosene, and leaded gasoline.

Release Data: No known releases

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments:

References:

Oak Ridge Gaseous Diffusion Plant Building Directory, FID 5802, July 1951.

Oak Ridge Gaseous Diffusion Plant Building Directory, FID 5802, July 1958.

Asphalt Batch Plant: General Arrangement, Drawing No. AWS-4970A, Carbide and Carbon Chemicals Company, Oak Ridge Tennessee, April 1947.

Asphalt Batch Plant Elevations, Drawing No. AWS-4988-A, Carbide and Carbon Chemicals Company, April 24, 1947.

Oak Ridge Gaseous Diffusion Plant, Drawing No. S-KT-K100, Rev. 19, Union Carbide Nuclear Division, November 1970.

Date Prepared: August 1994

Date Revised: June 1995

K-1098-C Asphalt Plant

Unit Name: K-1099 Blair Quarry

Unit Number: R019

Project Status:

Unit Location: K-25 Site External Plant Area, north of Blair Road, approximately 1000 ft east of the Poplar Creek Bridge

Approximate Dimensions and Capacity: 0.1 acre

Dates Operated: 1945 to 1957

Present Function: A large concrete structure, formerly used as a valve tester in association with a NASA project, is currently in place in the quarry. A portion of the structure now houses a seismograph. The quarry floor is covered with vegetation. Local geologists occasionally visit the site to see the thrust fault that comprises the contact between the Chepultepec Dolomite and Knox Dolomite. A recent survey found no indications of radiological contamination in the quarry.

Life Cycle Operation: The site ceased operation as a quarry in 1945, when it began to be used for open burning and burying of trash and debris. The majority of debris included such items as construction trash, cleaning rags and cafeteria garbage. According to a former worker, non-combustibles such as metal drums and rubble were buried to fill pits, including those containing water. A large concrete structure was built in the quarry as a valve tester in association with a NASA project. A portion of the structure now houses a seismograph.

Waste Characteristics: Combustible wastes such as paper, wood, and construction rubble contaminated with uranium were burned on the site. There is some indication that waste oils, which may have contained PCBs, were also burned. Administrative policy directed that no contaminated material, as defined in the 1940s and early 1950s, be burned or buried in the quarry.

Radiological contamination was discovered in the quarry in 1991. In 1993 the contamination areas were decontaminated, and a 1994 health physics survey revealed no surface contamination.

Release Data: A groundwater sample collected from a characterization well at the unit indicated alpha activity above the drinking water standard of 15 pC/L. Groundwater monitoring data from well BRW-1 has been collected at this site.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Groundwater, soil

Comments: This unit is also known as Blair Road Quarry and Blair Hollow Quarry.

References:

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1099 Blair Road Quarry, ORGDP, Oak Ridge, Tennessee, K/HS-157, Martin Marietta Energy Systems, Inc., September 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., *Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant*, K/SUB/85-22224/12,
Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee,
December 1989.

Date Prepared: April 1987

Date Revised: May 1995

K/PH87-0607

LOCATION OF
BRANCH OF
WHITEOAK MOUNTAIN FAULT

K-1099 Blair Quarry

Unit Name: K-1131 Feed and Tails Facility

Unit Number: R137

Project Status:

Unit Location: K-25 Process Plant Area, north of K-27 and K-29

Approximate Dimensions and Capacity: 390 × 100 ft; 45 ft high; 55,754 ft² floor area

Dates Operated: 1945–85

Present Function: Shutdown. The HF processing equipment is still present, but the electrolytic fluorine production cells have been removed. Many of the hydrogen distribution headers are still intact. The electrical distribution bus work in the ground floor cell area and the selenium oxide rectifiers on the mezzanine floor are also still present.

Life Cycle Operation: K-1131, a one-story steel frame building with transite siding, was built in 1945 as a dry air plant for the K-25 Building cascade. In 1952, K-1131 was converted to a UF₆ production facility, which operated for about 10 years. Equipment was installed for handling hydrogen fluoride liquid and gas for distribution to both the uranium hydrofluorination equipment and the electrolytic fluorine production cells. K-1131 was converted to a UF₆ feed vaporization and depleted UF₆ tails withdrawal facility for the enrichment cascades in 1962. A compression-liquefaction system was installed to provide a secondary process for withdrawal of UF₆ tails from the cascade. The fluorine production facility in K-1131 was shut down in 1982. Steam exhaust autoclaves were installed to vaporize the contents of cylinders and supply UF₆ feed to cascade feed points.

Ash receivers from feed plant towers were stored in a row along Avenue M west of K-25 for 22 days at a time. Following venting to the atmosphere, the ash was repackaged in five-ton containers and transported to K-1231. In K-1231 the ash was pulverized and refeed to the K-1131 towers. Following successive refeedings, the spent ash was discarded, although its disposition is not known. The UF₆ tails withdrawal and UF₆ feed vaporization facilities were shut down in 1985.

Waste Characteristics: Uranium, metals, and other chemical wastes

Release Data: No known releases. Contamination of the storage area along Avenue M is possible.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building surfaces and equipment

Comments: There are classification concerns associated with this unit.

References:

Phase I Hazard Screening Analysis for K-1066-B Cylinder Storage Yard, HS/K-1066B/PK/51.1/R0, March 1992.

Date Prepared: February 1995

K-1131 Feed and Tails Facility

Unit Name: K-1131 Neutralization Pile

Unit Number: C074

Project Status:

Unit Location: K-25 Site Process Plant Area, north of the K-631/K-131 complex, just south of Poplar Creek

Approximate Dimensions and Capacity: Stone pile was about 45 ft in diameter with vertical side projections from about 8 to 20 ft. The 2-in. Monel line runs about 74 ft from a tie point with a hydrous HF mainline north of 9th Street.

Dates Operated: 1952–1962

Present Function: The area has been fenced to prevent public access from the creek bank. The pile itself has been eroded away and is partially obscured by a high growth of weeds and grass.

Life Cycle Operation: This facility was built as an emergency side stream drainline from the main hydrous hydrogen fluoride line connecting the K-1131 hydrofluorination process to rubber-lined storage tanks at the K-1132 tank farm. The hydrous HF contained uranium at concentrations less than about 10 ppm. The emergency drainline was used to handle infrequent abnormal process operations. The stone pile consisted of three gradations of stone: gravel, sand, and fines.

Waste Characteristics: Uranium

Release Data: Since its construction, the neutralization pile has been subject to infiltration by surface water. A radiation survey in Fiscal Year 1994 identified two additional areas of radiological contamination outside the fence. This contamination was believed to have been spread by burrowing animals. The areas have been roped off and posted.

Site Status: Burrowing animals will be removed following Tennessee Wildlife Resources Agency recommendations. The contaminated areas will then receive a clean cap as part of routine maintenance and be downposted. This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, surface water, biota

Comments:

References:

Annual Summary Report on the Surveillance and Maintenance Program for Remedial Action Inactive Waste Sites at the Oak Ridge K-25 Site, Fiscal Year 1994, K/ER-182, K-25 Environmental Restoration Program, Martin Marietta Energy Systems, Inc., November 15, 1994.

Drain Line from K-1131 to Neutralization Pile, Drawing C-AWP-12626, Carbide and Carbon Chemicals Company.

Low Excess HF System Flow Diagram, UCNC Drawing D-P-21111C, Rev. A.

Hydrofluorination Process Flow Sheet, Drawing E-P-22811S, UCNC.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: February 1992

Date Revised: May 1995

K/PH93-6526

K-1131 Neutralization Pile

Unit Name: K-1132 HF Storage

Unit Number:

Project Status:

Unit Location: K-25 Process Plant Area, near K-1066-E

Approximate Dimensions and Capacity: This unit consists of two small buildings and a storage shed.

Dates Operated: About 1952–1982

Present Function: Inactive

Life Cycle Operation: K-1132 contains steel tanks used for storage and transfer of anhydrous HF. Nitrogen distribution piping was used to pressurize railroad tank cars and the storage tanks to transfer liquid anhydrous HF to the storage tanks and from the storage tanks through distribution headers to the K-1131 Building.

K-1132 is made of structural steel with aluminum panel siding and roofing. The walls of the 3-sided shelter are raised about 4 ft above floor level by concrete support columns.

Waste Characteristics: Chemical contaminants

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building and equipment

Comments: This facility also includes the following subunits: K-1133 Storage Tank Shed; K-1134 Building, which contains the K-1134-A and -B storage tanks; and K-1135, a storage control building.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Preliminary Hazard Screening Worksheet for K-1132, PHS/K-1132/PK/251.1, September 17, 1991.

Date Prepared: February 1995

K-1132 HF Storage

Unit Name: K-1200-SB Centrifuge, South Bay

Unit Number:

Project Status:

Unit Location: K-25 Site Centrifuge Area

Approximate Dimensions and Capacity: 380 (max) × 60 ft; about 75 ft high; 22,800 ft²

Dates Operated: 1974–85

Present Function: Inactive

Life Cycle Operation: The Centrifuge Verification Test Facility (CVTF) portion is comprised of three systems used to test P1C centrifuges. Capabilities of the CVTF include UF₆ feed and withdrawal, purge and evacuation, and sampling of the product and tails assay used to determine separative performance characteristics. The First Article Evaluation Facility (FAEF) portion is a 15-centrifuge test installation configured to test P1C centrifuges and associated balance of plant process systems. The facility is highly instrumented for monitoring and controlling operational suitability testing and for recording test data. Centrifuge assembly, disassembly, balancing, and wreck disassembly functions were also performed in this area.

K-1200-SB is built of steel beams on a concrete slab with insulated metal siding. The 60-ft-wide bay was used primarily for manufacturing, testing, and storage with permanent multilevel stands occupying about 75 percent of the space. In the high bay is a pit measuring about 50 × 20 × 20 ft deep that is designated a confined space and radiological area.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Equipment and surfaces

Comments: There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K-1200-SB Centrifuge, South Bay

Unit Name: K-1206-E Sandblasting Residue

Unit Number: C076

Project Status:

Unit Location: A fenced, grassy area immediately surrounding the K-1206-E water tower, west of the K-33 Building in the Portal 8 parking lot

Approximate Dimensions and Capacity: Approximately 5000 ft²

Dates Operated: The water tower was built in the early- to mid-1950s. Sandblasting occurred in the late 1970s or early 1980s, and possibly on one earlier occasion.

Present Function: The tower is still in use; the soil around the tower has no function other than to accommodate the tower base.

Life Cycle Operation: The tower has been in use as a water tower since being built.

Waste Characteristics: Twelve TCLP samples collected in 1992 resulted in two with elevated lead levels (65.5 and 479 ppm). The lead is assumed to have come from leaded paint sandblasted from the water tower in the 1979-82 time period.

Release Data: No known releases

Site Status: This unit is maintained as part of the general site area surveillance and maintenance, and not as a discrete waste unit.

Media of Concern: Soil

Comments:

References:

Analytical Services Certificate of Analysis: Job Number MMOK 50334, International Technology Corporation, Knoxville, Tennessee, February 4, 1992.

Date Prepared: January 1993

Date Revised: March 1995

K-1206-E Sandblasting Residue

Unit Name: K-1210 Centrifuge Test Facility

Unit Number: None

Project Status:

Unit Location: K-25 Site Centrifuge Area

Approximate Dimensions and Capacity: 160 × 110 ft; 29,660 ft²; 85 ft high

Dates Operated: 1975–85

Present Function: A portion of the building is used for offices.

Life Cycle Operation: The Centrifuge Test Facility was used to test the reliability and operability of a substantial number (400) of centrifuge machines. This facility also served as a pilot plant for testing feed, withdrawal, and UF₆ transfer systems. The K-1210 building is constructed of steel beams on a concrete slab with insulated metal siding. It is composed of high, intermediate, and low bay areas.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases to the environment

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building interior and equipment

Comments: For decontamination and decommissioning purposes, the K-1004-N-2 Cooling Tower is considered a subunit of this facility. There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: May 1995

K-1210 Centrifuge Test Facility

Unit Name: K-1210 RCW Lines and Cooling Towers

Unit Number: C003d

Project Status:

Unit Location: K-25 Site Main Plant Area, immediately east of the K-1210/1220 buildings

Approximate Dimensions and Capacity: RCW (recirculating cooling water) lines: 550 linear ft; 2–5 inches deep, 4–12 inches in diameter.

Dates Operated: 1975–1985

Present Function: Inactive

Life Cycle Operation: K-1210 RCW System, which includes the K-1004-N1 and K-1004-N2 cooling towers, supplied secondary cooling to the Centrifuge Test Facility, K-1200 Assembly Area, K-1210-A Advanced Engineering Test Facility and K-1225 Centrifuge Plant Demonstration Facility. Sanitary water was used for makeup, treated with Dearborne 321 Biocide, Dearborne 4622 Corrosion Inhibitor and Zimmite Chemtrol 19 Biocide.

Waste Characteristics: In a telephone conversation, representatives of Dearborne said that the 321 Biocide and 4622 Corrosion Inhibitor contained no chromates, volatile or semi-volatile organics. Zimmite Chemtrol 19 contains an organic active ingredient and is considered a slight (MSDS-1) health hazard. A pentachlorophenol fungicide treatment, which contains or degrades to traces of dioxin, may have been used on the tower.

Release Data: No known releases

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: This unit encompasses the K-1210 Recirculating Cooling Water Lines, K-1004-N1 and K-1004-N2 Cooling Towers.

References:

RCRA Facility Investigation Plan, Cooling Tower Basins and Process Lines, ORGDP, Oak Ridge, Tennessee, K/HS-151, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K-1210 RCW Lines and Cooling Towers

Unit Name: K-1210-A Advanced Equipment Test Facility

Unit Number:

Project Status:

Unit Location: K-25 Site Centrifuge Area

Approximate Dimensions and Capacity: 10,725 ft²; 85 ft high

Dates Operated: 1978–85

Present Function: A portion of the building is used for offices.

Life Cycle Operation: The Advanced Equipment Test Facility (AETF) was used primarily to test the reliability of the production centrifuges to be used in the Centrifuge Plant Demonstration Facility and the full size gas centrifuge enrichment plant. The facility was also operated to test plant subsystems. The building is constructed of steel beams on a concrete slab with insulated metal siding and is composed of high, intermediate, and low bay areas.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases to the environment

Site Status:

Media of Concern: Building internal surfaces and equipment

Comments: There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K-1210-A Advanced Engineering Test Facility

Unit Name: K-1217 Metallizing Shop

Unit Number: K-C116

Project Status:

Unit Location: K-25 Site Main Plant Area; this unit was located where the northeastern building wing is now located at K-1401.

Approximate Dimensions and Capacity: 32 × 16 ft

Dates Operated: 1944–72

Present Function: The northeastern wing of K-1401 is now located on top of where this unit once stood.

Life Cycle Operation: During World War II, Ford, Bacon and Davis Inc., built several temporary buildings during construction of the K-1401 Conditioning Building. K-1217 Building, located on the northeast side of K-1401, was used for cadmium spray coating of uranium enrichment cascade equipment. In 1947 the building, originally designated T-11-4, was redesignated T-27. It was described as a metallizing shop in 1949. The building was demolished to allow for expansion of the K-1401 in 1972.

Waste Characteristics: Cadmium, organic solvents

Release Data: No known releases

Site Status: This facility is now demolished, and the K-1401 building has been expanded over its former location.

Media of Concern: None

Comments: Although this unit was at one time designated T-27, it should not be confused with the T-27 Pipe Welding Shop, located south of K-1401 on Boulevard Road. The T-27 pipe welding shop was later designated T-5 by Ford, Bacon and Davis, and later K-1227 and K-1228 by Carbide and Carbon Chemicals Corporation.

References:

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 and K-27 Plot Plan, Rev. 3, Drawing No. AW-1M, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Clinton Engineer Works, Clinton, Tennessee, Area K-25, Location of Temporary Buildings, Drawing No. F-3456-1112, Ford, Bacon, and Davis Inc., June 14, 1944.

Heating —Temporary Buildings Plot Plan, Ford, Bacon, and Davis Drawing No. F-3456-40, Clinton Engineer Works, September 25, 1943.

Conditioning Area T-27: Addition for Cadmium Spray Booth, Drawing No. AW-913-A, Carbide and Carbon Chemicals Company, November 23, 1945.

Date Prepared: August 1994

Date Revised: June 1995

K/PH94-2617

K-1217 Metallizing Shop

K/PH94-3835

K-1217 Metallizing Shop

Unit Name: K-1218 Coded Chemicals Storage Facility

Unit Number: C131

Project Status:

Unit Location: K-25 Main Plant Area; the K-1218 Building was located about 225 ft west of the K-1407-B Holding Pond. The eastern edge of the yard was about 75 ft west of the pond, and the east-west centerline of the storage yard was about 60 ft north of east/west centerline of the K-1407-B Holding Pond.

Approximate Dimensions and Capacity: Building dimensions were 12 × 16 ft; the fenced storage area was 250 × 63 ft.

Dates Operated: Late 1940s

Present Function: The storage facility has been removed and the site is now located under the K-1070-B Old Classified Burial Ground.

Life Cycle Operation: Beginning in 1946 or 1947, a storage building and yard were established to store a variety of hazardous and radioactive chemicals. By 1949 the area was no longer used, and the building was destroyed by burning. A description of the building contemporaneous with its destruction describes it as "vacant, deteriorated and radioactive."

Waste Characteristics: Hazardous materials used at this site included uranium-contaminated MFL (Miller's Fluorinated Lubricating oil), a fluorinated synthetic oil (C₂F₃Cl); uranium- contaminated carbon absorbent; and uranium oxide recovered from decontamination solutions. Carbon tetrachloride and other solvents, lubricating oils, mercury, trace quantities of toxic and corrosive chemicals formed in the breakdown and reconstitution of MFL, and trace quantities of heavy metals from the failure of vacuum pumps using MFL in the K-1301/1302/1303 complex are other possible hazardous materials.

Release Data: The building, described as radioactively contaminated, was destroyed by burning.

Site Status: The land area of this unit is now underneath the K-1070-B Burial Ground, which is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Surface soil

Comments:

References:

Recommendation to Dismantle a Property, ORGDP Work Order No. 297536, Carbide and Carbon Chemicals Corporation, June 23, 1949.

K-25 and K-27 Plot Plan, Rev. 3, Drawing No. AW-1M, Carbide and Carbon Chemicals Corporation, December 26, 1946.

K-25 Site Photo No. K/PH 91-2975, photograph of K-1218 Coded Chemicals Storage Facility taken from DOE Negative K-25-317, 1945.

K-25 Site Photo No. K/PH 91-3000, photograph of K-1218 Coded Chemicals Storage Facility taken from DOE Negative K-25-347, 1945.

DOE Photo No. MED-246, Large Aerial View of K-25 Site Showing K-1218 Yard in Place.

DOE Photograph No. 57-669, Large Aerial View of K-25 Site Showing K-1218 Yard Cleared, 1957.

Date Prepared: August 1994

Date Revised: June 1995

K-1218 Coded Chemicals Storage Facility

Unit Name: K-1220 Centrifuge Plant Demonstration Facility

Unit Number: None

Project Status:

Unit Location: K-25 Site centrifuge area

Approximate Dimensions and Capacity: 78,500 ft²; 175 ft tall

Dates Operated: 1981–85

Present Function: A portion of the building is used for research and offices.

Life Cycle Operation: K-1220 was used primarily to test operations on equipment designs to be used in the Gas Centrifuge Enrichment Plant (GCEP), including a P1 cascade and supporting processes. The building is constructed of steel beams on concrete slabs with insulated metal siding and is composed of high, intermediate, and low bay areas.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases to the environment

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building interior and equipment

Comments: K-1220 CPDF-1 and K-1220 CPDF-2 are subunits in this facility. There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: February 1995

K-1220 CPDF-1 and -2

Unit Name: K-1231 Process Building

Unit Number: R144

Project Status:

Unit Location: K-25 Site Process Plant Area between K-1131 and K-27/K-29

Approximate Dimensions and Capacity: 162 × 42 ft; 40 ft high; 12,168 ft² floor area

Dates Operated: 1945–1980s

Present Function: Shutdown

Life Cycle Operation: K-1231, a one-story steel frame structure with corrugated asbestos siding, has been used for three separate missions. One involved operation of a large pulverizer/screener for multi-ton quantities of uranium oxides. This unit was located in the west bays of the building with a partition extending from floor to roof. During the latest building modification in the 1970s, the partition was removed. All equipment within the building is in place from its last mission.

Waste Characteristics: This unit contains both chemical and radioactive contamination.

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building equipment and surfaces

Comments: K-1231-A and -B storage are subunits of this facility. There are classification concerns associated with this facility.

References:

Phase I Hazard Screening Analysis for K-1231, HS/K-1231/PK/62.1/R0, February 1993.

Date Prepared: February 1995

K-1231 Process Building

Unit Name: K-1232 Chemical Recovery Facility & Lagoon

Unit Number: C101

Project Status:

Unit Location: K-25 Site Process Plant Area at the intersection of 7th Street and Avenue P

Approximate Dimensions and Capacity: Lagoon size of 150 × 100 ft; capacity of batch operation 1000 to 2000 gal

Dates Operated: 1970s–1994

Present Function: Inactive. The lagoon area is used for collecting rainwater.

Life Cycle Operation: From 1972 to 1980, K-1232 was used to process classified material. The products and byproducts used in the process were kept under tight controls and are considered nonhazardous. Beginning in 1984 the facility was used to treat corrosive wastewaters from the Y-12 Plant by neutralization, metal removal, and carbon filtration for aqueous waste with organic constituents. In 1987, facilities for handling Y-12 wastes were completed and placed in operation at that plant. Intermittent waste treatment activities were carried on at the facility until 1994.

Waste Characteristics: The operations conducted at the facility indicate the possibility of volatile organics, polynuclear aromatic hydrocarbons and heavy metals contaminating groundwater.

Release Data: No known releases

Site Status: This unit is under the purview of the Waste Management Division.

Media of Concern: Structures and equipment

Comments: This unit is also referred to as the K-1232 Treatment Facility Lagoon and has in the past been reported along with the K-1232 Chemical Recovery Facility (R014). There are classification concerns associated with this facility.

References:

RCRA Facility Investigation Plan, K-1232 Treatment Facility, ORGDP, Oak Ridge, Tennessee, K/HS-145, Martin Marietta Energy Systems, Inc., March 1988.

K-25 Plant Site Waste Area Grouping Strategy Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/ER-22, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, February 1990.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

RCRA Facility Investigation Plan, K-1232 Treatment Facility, ORGDP, Oak Ridge, Tennessee, K/HS-145, Martin Marietta Energy Systems, Inc., March 1988.

Date Prepared: June 1995

K-1232 Chemical Recovery Facility & Lagoon

Unit Name: K-1233 Collection Facility

Unit Number: R145

Project Status:

Unit Location: K-25 Site Process Plant Area, adjacent to K-413

Approximate Dimensions and Capacity: 100 × 50 ft; 3300 ft² floor area

Dates Operated: 1975–82

Present Function: Shutdown

Life Cycle Operation: K-1233 was built to house chemical processing equipment to produce material in support of the uranium enrichment cascades. The facility was shut down in 1982 and the inventory was removed from the process equipment. The building contains conventional chemical processing equipment including tanks, pumps, mixers, etc. No uranium or radioactive material has been processed in this building; however, it has been posted as a radiological area because it shares contaminated process piping with the adjoining K-1231 Building.

K-1233 is a two-story structure built of prefabricated metal panel on a concrete foundation. It is provided with a water sprinkler fire suppression system which was converted to a dry system when the building was shut down.

Waste Characteristics: Mixed chemical and radioactive wastes

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building piping

Comments: K-1233-A Drum Cleaning Facility is a sub-unit of this facility. There are classification concerns associated with this facility.

References:

Phase I Hazard Screening Analysis for K-1233, HS/K-1233/PK/64.1/R0, March 1992.

Date Prepared: February 1995

K/PH94-4678

K-1233 Collection Facility

Unit Name: K-1236 Paint Shop

Unit Number: C084

Project Status:

Unit Location: K-25 Site Main Plant Area, on the east side of Boulevard Road in the immediate vicinity of where building K-1220 now stands

Approximate Dimensions and Capacity: Approximately 30 × 50 ft

Dates Operated: Mid-1940s

Present Function:

Life Cycle Operation: Building K-1220 now stands in the immediate vicinity of where Building T-7 once stood. Ford, Bacon and Davis Building T-7 was used as a paint shop during construction of the Oak Ridge Gaseous Diffusion Plant. The building had been redesignated as K-1236 Paint Shop by the spring of 1947. The building was ordered demolished in the fall of 1947 and was no longer in existence by 1951.

Waste Characteristics: Wastes associated with a 1940s paint shop would likely have included compounds of chromium, zinc, titanium, antimony, aluminum, copper, cadmium, gold, zinc, cobalt manganese, iron, calcium and lead. Organic compounds would have included phenolic and petroleum resins, aromatic acids, urea, melamine, nitrocellulose lacquers, polystyrene, styrene, acrylate, allyl, silicone, turpentine, petroleum-based thinners, butyl acetate, butyl alcohol, ethyl acetate, ethyl alcohol, toluene, naphtha and naphthenates of copper, zinc and mercury.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This unit has been demolished and is not managed as a discrete unit apart from the general site area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

Date Prepared: January 1993

Date Revised: June 1995

K-1236 Paint Shop

Unit Name: K-1300 Brick Stack

Unit Number: D003d

Project Status:

Unit Location: K-25 Site Main Plant Area north of Building K-1401

Approximate Dimensions and Capacity: 6 × 6 × 75 ft

Dates Operated: 1944–85

Present Function: Inactive

Life Cycle Operation: K-1300 was a disposal stack used to discharge accidental releases of gaseous fluorine from the fluorine production facility in K-1301, the fluorine liquefaction facility in K-1303, and the fluorine storage facility in K-1302. It was later used to discharge and disperse gaseous fluoride wastes from the K-1401 and K-1420 fluorination furnace stands, the uranium oxide fluorination systems located in K-1301 and K-1420, and the K-1423 toll enrichment facility. The stack was capped, and the fan motors were electrically disconnected after enrichment operations were shut down.

Waste Characteristics: Uranium

Release Data: This unit was used to release gases to the atmosphere. Any residual radioactive material remaining in the stack is contained by a cap on the top.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Inside of stack, soil, groundwater

Comments:

References:

Date Prepared: February 1995

K-1300 Brick Stack

K/PH 95-2363

Unit Name: K-1301 Fluorine Production Facility

Unit Number: D003c

Project Status:

Unit Location: K-25 Site Main Plant Area, north of K-1401

Approximate Dimensions and Capacity: 9831 ft²

Dates Operated: 1943–85

Present Function: Inactive. The southeast corner of the building is being used as a pump storage and maintenance facility. The west end has been converted to a changehouse.

Life Cycle Operation: K-1301 was built as a fluorination reaction process. An air liquefaction facility with liquid nitrogen distribution equipment was also located in this building in the 1960s. K-1301 is a one-story structure with a penthouse running the length of the building. The support structure is built of reinforced concrete. Exterior and interior walls are cinder block except for the walls surrounding the 10 cubicles, which are brick.

Waste Characteristics: Mixed chemical and radioactive contamination

Release Data: Accidental releases from this facility were vented through the K-1300 Brick Stack.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Internal areas of building

Comments: This unit is also known as the Old Nitrogen Facility and as the K-1301 Utilities Office and Storage Area.

References:

Date Prepared: February 1995

K-1301 Fluorine Production Facility

Unit Name: K-1302 Fluorine Storage Building

Unit Number: D003b

Project Status:

Unit Location: K-25 Main Plant Area, north of K-1401

Approximate Dimensions and Capacity: Floor area of the RCRA storage bay is 16 ft × 4.5 ft, containing about 20 cylinders. Total building area is 3256 ft²

Dates Operated: 1943–present

Present Function: The RCRA storage bay holds a horizontal gas surge tank, which is original process equipment now inactive. The room no longer accommodates the cylinder storage-venting operation.

Life Cycle Operation: K-1302 was formerly the fluorine storage and distribution facility. Most valves were operated outside of the south wall. The building includes five bays separated by concrete walls. Each bay contains a formerly used fluorine tank with valves and piping. Bay 3 is the only part of the facility currently in use, as a RCRA storage area for hazardous gas cylinders, at least one of which is radioactive. The following purged fluorine tanks are still in place in the other bays: Bay 1, 1000 gal; Bay 2, 500 gal; Bay 4, 5000 gal; Bay 5, 5000 gal.

Bay 3 contains ignitable, corrosive, reactive, and toxic wastes. The inventory includes fluorine, UF₆, HF, CO, xenon, methane, propane, arsenic pentafluoride, nitrogen, trifluoromethyl iodide, chlorine trifluoride, chlorine, argon, fluorine, tungsten fluoride, oxygen difluoride, phosphorous pentafluoride, HB, silicon fluoride, and other unmarked containers.

The facility's underground plenum has been used to exhaust leaking UF₆ cylinders, thus becoming radioactively contaminated.

Waste Characteristics: Various gases that include hydrogen fluoride, fluorine, phosgene, chlorine, and other nonflammable compressed gases. During one period, for which dates are not available, the room also held the plant's inventory of ClF₃, although such storage was not part of the storage/venting system. Uranium is a contaminant of concern.

Release Data: The only releases from the unit have been under controlled conditions where cylinders are vented through an exhaust stack within the storage area. This stack is permitted under the Clean Air Regulations of TDEC.

Two areas of high contamination (350,000 and 1.8 M dpm/100 cm²) have been detected in the building. These areas have been posted as high contamination areas, and the entire building is posted as a contamination area.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Soil and groundwater

Comments: This unit is also known as K-1302 Gas Cylinder Storage Area.

References:

Architectural Floor Plan, Kellex Corp. Drawing No. N-3456-H-201, Ford, Bacon, and Davis, Inc., IS, March 16, 1944.

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Phase I Hazard Screening Analysis for the K-1302 RCRA Storage Facility, HS/K-1302/PK/67/R0, March 1992.

Date Prepared: April 1987

Date Revised: June 1995

K/PH87-0955

K-1302 Fluorine Storage Building

K-1302 Fluorine Storage Building

Unit Name: K-1303 Fluorine Facility

Unit Number: D003c

Project Status:

Unit Location: K-25 Site Main Plant Area, north of K-1401

Approximate Dimensions and Capacity: L-shaped overall, 180 × 88 ft; 13,000 ft²

Dates Operated: 1944 to 1970s

Present Function: Inactive. Compressor test equipment is still stored in the building.

Life Cycle Operation: K-1303 was built to house equipment for fluorine liquefaction and vaporization. The area was designed and operated by Hooker Electro-Chemical Company under contract to the Manhattan Engineer District. Fluorine produced in K-1301 was piped to any of 12 cubicles on the east half of K-1303, where the product was condensed as a liquid; the collection vessels were periodically operated through a heat cycle in which the liquid fluorine was converted to a pressurized gas that was distributed to K-1302.

After the introduction of diaphragm compressors in K-1301 in 1947, the fluorine liquefaction/vaporization equipment was removed from K-1303, and the area was assigned to new operations. From 1947 to 1956 operations in the east portion of the building included the recovery and stabilization of uranium-contaminated lubrication oils by filtration and reaction with cobaltic fluoride. Other operations included vacuum distillation of mercury, oxidation of ammonium diurate in electric furnaces, and various gaseous, solution, and solid uranium sampling operations.

From 1948 to 1955, a converter dismantling and decontaminating facility was installed in the west end of K-1303. This facility had disassembly booths on the southwest side of the building and stainless steel spray booths on the west end. Safe geometry solution storage loops extended approximately 100 ft west of the building. Evaporators were in place at the west end of the storage loops and north of the building for concentrating contaminated cleaning solutions (HNO₃ and water) and uranyl nitrate product. Underground condensate drain lines extended from these evaporators east to the K-1407-B Holding Pond.

Following the cessation of decontamination operations in the mid-1950s, the building was used for a research compressor operation. In the 1960s, other modifications were made to accommodate an air model test operation, which used a type of wind tunnel as a means for testing internal flow fields using air as the test fluid.

The original portion of K-1303 was built with a concrete support structure. The area now called the test area is a 1966 addition consisting of a steel framework and cinder block exterior walls. The two compressor porches on the east side of the building are enclosed with transite siding.

Waste Characteristics: Mixed chemical and radioactive wastes, including uranium and mercury

Release Data: Gas releases from this facility would have gone through the K-1300 Brick Stack. Solution leakage from storage loops west of K-1303 may have contaminated the soil in this area. Inadvertent leaks from the decontamination spray booths located in the west end of the building and the solvent extraction uranium recovery system in the southwest quadrant probably contaminated soil underneath this section of the building.

Diffusion cascade compressors used in the air model test facility periodically leaked oil, some of which was discharged through the atmosphere via the exhaust system. This oil-stained area is located near and runs parallel to the east face of the K-1303 facility, describing a matching vertical projection of the overhead exhaust duct. Although no toxic or radioactive materials were associated with the air model test facility, the earlier use of this building for decontamination activities raises the concern of latent ground contamination under and outside of K-1303.

Mercury releases are discussed in the K-1303 Mercury Distillation and Recovery Unit report.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Soil and groundwater

Comments: This unit is also known as the Research Compressor Building and the Model Test Facility.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities,
K/DD-45, December 1992.

Date Prepared: May 1995

K-1303 Fluorine Facility

Unit Name: K-1303 Mercury Distillation and Recovery Unit

Unit Number: R074

Project Status:

Unit Location: K-25 Site Main Plant Area underneath a K-1303 Building extension

Approximate Dimensions and Capacity: The extent of mercury soil contamination is unknown, but is suspected of running the entire length of at least one side of the building.

Dates Operated: 1948–56

Present Function: The mercury distillation and recovery unit is no longer in operation.

Life Cycle Operation: The K-1303 facility has accommodated a variety of major operations, including units for fluorine production, decontamination and recovery of fluorinated lubricating oils, vacuum distillation and recovery of mercury, decontamination of uranium-enrichment process equipment, air model testing and a research compressor.

The Mercury Distillation and Recovery Unit was located in cubicle 2 within the north bay of Building K-1303 prior to a 103 × 31 ft northeast bay being added in 1966. In 1948 the cubicle 2 exhaust system was modified to direct and discharge mercury fumes to the atmosphere above the building's roof.

Waste Characteristics: Mercury, thought to be located primarily under the existing building extension, was the initial concern. An FY 1994 radiation survey identified an additional area of radiological contamination, which has been roped off and posted. Stains on the ground at the northeast corner of the building were tested in Fiscal Year 1994 and found to contain PCBs at approximately 3.4 ppm.

Release Data: During a 1991 "walk down" inspection, a former mercury unit worker recalled that globules of mercury used to collect on the ground along the roof's drip line prior to the addition of the northeast wing over the area. The globules may be explained by the presence of the exhaust system installed in 1948 for cubicle 2. This system discharged mercury fumes into the atmosphere above the roof. Some of the fumes may have condensed onto the roof and eventually been washed by rainfall onto the ground alongside the building.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater, storm drains

Comments:

References:

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Exhaust and Water Service for Mercury Stills, Bldg. K-1303, Drawing No. AWP-7764-1, Carbide and Carbon Chemicals Company, May 25, 1948, Revised June 4, 1948.

Compressor Development Facilities Modifications: Elevations and Details, Drawing No. E-S-30967-B, Rev. 1, Union Carbide Corporation Nuclear Division, June 9, 1966.

Date Prepared: May 1991

Date Revised: February 1995

K-1303 Mercury Distillation and Recovery Unit

Unit Name: K-1401 Acid Line

Unit Number: R013

Project Status:

Unit Location: K-25 Site Main Plant Area. The K-1401 Acid Line runs along the east side of K-1401.

Approximate Dimensions and Capacity: 10-in. diam. Approximately 1500 ft long.

Dates Operated: 1944 to 1987

Present Function: Inactive

Life Cycle Operation: This line was used to transfer corrosive solutions from the K-1401 Maintenance Facility to the K-1407-A Neutralization Facility. The lines were taken out of service in 1987.

Waste Characteristics: The waste streams that have been transported through this acid line include degreasers, caustics and acids used to clean equipment exposed to uranium tetrafluoride. Degreasers contained organics including trichloroethene, trichloroethylene, and carbon tetrachloride. Freon, cutting oil, aromatics, acetone, paints, epoxy and methyl-ethyl ketones were also sent through the lines. Metals included chromium (chromic acid) and mercury from instruments and containers.

Release Data: In 1975, the line leaked and was partially replaced. Subsequent leaks occurred due to the acid making its way through joints and corroding limestone around the pipe. The K-1401 drain line was slip-lined in 1982 with a 10-inch polyethylene sleeve. The line was leak-tested in 1987 and found to leak. In 1990, mercury was found in a portion of cast iron drain line being removed in the north-end basement. Spilled mercury was cleaned up the same day.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments:

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1401 Acid Line, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-142, Martin Marietta Energy Systems, Inc., March 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: March 1995

K/PH-RN88

K-1401 Acid Line

Unit Name: K-1401 Degreasers

Unit Number: C005

Project Status:

Unit Location: K-25 Site Main plant area, between column lines J and K on the east side of K-1401

Approximate Dimensions and Capacity: 10 × 50 ft (4 each)

Dates Operated: 1944 to 1988

Present Function: Inactive

Life Cycle Operation: Degreasing and cleaning operations began in 1944 to service various sized and shaped parts associated with the Oak Ridge Gaseous Diffusion Plant's uranium enrichment process. Acids, alkalis, detergents, and organic vapor degreasers have been used in the process. Hydrochloric acid for this operation was stored in the K-1404-A 8000–10,000 gal fiberglass tank, and trichloroethane was stored in the K-1404-B 10,000 gal steel tank. Both of these tanks are diked and located on the east side of K-1401. This cleaning facility was an expansion and modification of existing facilities to accommodate the cascade improvement and cascade upgrade program (CIP/CUP), which began in the early 1970s and was completed in 1981.

Waste Characteristics: Trichloroethylene was the common degreaser from the 1940s through 1960s and was replaced by trichloroethane in the 1970s. Carbon tetrachloride was probably used in small quantities in the 1940s and 1950s.

Release Data: Releases were through the K-1401 acid line.

Site Status:

Media of Concern: Building interior and equipment

Comments:

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1401 Acid Line, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-142, Martin Marietta Energy Systems, Inc., March 1988.

Date Prepared: April 1987

Date Revised: February 1995

K-1401 Degreasers

Unit Name: K-1401-N Converter Re-Tubing Area

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area; on the northeast end of the K-1401 Building

Approximate Dimensions and Capacity: 13,198 ft²

Dates Operated: 1970s

Present Function: Inactive

Life Cycle Operation: The K-1401-N was built during the 1970s to support the cascade improvement program. Facilities were provided to install, test, and assemble barrier in process converters.

Waste Characteristics: Mixed chemical and radiological contamination

Release Data: Releases from K-1401 were through a series of process drains, which are discussed in the K-1401 Acid Line write-up.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building interior

Comments: There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for the K-25 Site Decontamination and Decommissioning Facilities, K/DD-45, December 1992.

Architectural Ground Floor Plan, Kellex Corp. Drawing No. N-3456-A-20, Ford, Bacon, and Davis, Inc., October 25, 1943.

Date Prepared: May 1995

K-1401-N Converter Re-Tubing Area

Unit Name: K-1401-NB Basement Area

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area; north basement of the K-1401 Building

Approximate Dimensions and Capacity: 68,000 ft²; 17 ft high

Dates Operated: 1944–1987

Present Function: Inactive

Life Cycle Operation: Process equipment in this area originally supported the converter conditioning stands on the first floor. These stands treated process equipment from the enrichment cascade.

Waste Characteristics: Chemical and radiological wastes

Release Data: Releases from K-1401 were through a series of process drains, which are discussed in the K-1401 Acid Line write-up.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Internal building surfaces and equipment

Comments: There are classification concerns associated with this unit.

References:

Surveillance and Maintenance Plan for K-25 Site Orphan Facilities, K/DD-44, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1992.

Date Prepared: February 1995

K-1401-NB Basement Area

Unit Name: K-1407 Contaminated Debris

Unit Number: C132

Project Status:

Unit Location: K-25 Site Main Plant Area, just south of the western end of the K-1407-C Retention Basin

Approximate Dimensions and Capacity: 50 × 25 ft; however, the extent of contaminated debris under the ground is unknown.

Dates Operated: Radioactive materials have been present in the K-1407 area since the 1940s; the exact date in which some of them found their way to this area is unknown.

Present Function: Drainage ditch for a gravel road. The area has been posted as an underground radioactive contamination area.

Life Cycle Operation: While doing drainage excavation for the K-1407-B and -C ponds closure in July 1994, debris with elevated beta-gamma counts was uncovered several inches below ground level along a ditch beside a gravel road. Construction activities stopped and the area was marked with radioactivity contamination boundary rope. The exact source, nature, and extent of contamination is unknown. However several activities could have contributed to the contamination.

The area in which the contamination was found has been used since construction of the K-25 Site in the mid-1940s for unofficial borrowing and filling of spoil dirt from routine roads and grounds operations. Through the 1970s, dirt of this nature was not routinely scanned for alpha contamination, and some contaminated material may well have made its way to this unit. In addition, the entire K-1407 area was outside the K-25 Site perimeter fence through the 1960s, and is known to have been used for unofficial disposal of unclassified materials, including radioactively contaminated ones. Evidence of this type of dumping has been discovered several times in nearby areas and is thought to have occurred throughout this area. These dumping operations were done according to accepted waste disposal practices of the day. As such, records are not available on these activities.

A variety of nearby operations may be sources of contaminated debris at this unit during the course of earth moving operations through the years. Based on groundwater evaluation, the K-1407-C pond area should not be considered a source for elevated counts.

Waste Characteristics: Debris contaminated with beta/gamma emitters

Release Data: No known releases. The debris has been recovered and posted as an underground contamination area.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Subsurface soil, groundwater

Comments:

References:

Site Evaluation Report for the K-1407 Contaminated Debris at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-189, Internal draft, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, December 1994.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: August 1994

Date Revised: June 1995

K/PH94-3850

K-1407 Contaminated Debris

Unit Name: K-1407-B Holding Pond

Unit Number: R004

Project Status: RCRA/CERCLA

Unit Location: K-25 Site Main plant area, on the north side of the K-25 Site, about 200 ft south of Poplar Creek and immediately south of Mitchell Branch (K-1700 Stream)

Approximate Dimensions and Capacity: Approximately 400 ft long, 150 wide and max depth 8 ft; 1.3 acres; capacity about 2.5 million gal

Dates Operated: 1943–1988

Present Function: A closure of the pond was completed in early 1995. The pond has been filled, capped, seeded, and posted as an underground radioactive contamination area.

Life Cycle Operation: This unit was used as a settling basin for metal hydroxide sludges that were precipitated after neutralization in the K-1407-A Neutralization Pit. Waste water was also discharged directly into the pond from the following locations: K-1303, K-1302 RCW (recirculating cooling water) supply, K-1503 Neutralization Pit, K-1421 Incinerator drain, and the following K-1420 operations: plating facility rinsewater, Mercury Recovery Room, decontamination facility spray booth rinse water, A-floor pan cleaning, cylinder cleaning solution, vapor blaster solutions, and pigtail cleaning solution.

To satisfy requirements of the 1984 Hazardous and Solid Waste Amendments (HSWA), the discharge of all wastes into the K-1407-B/C ponds ceased before November 1, 1988. Between 1987 and 1989 waste sludge was excavated from the ponds in anticipation of their closure as RCRA-regulated units. Verification sampling conducted after sludge removal confirmed the presence of low-level residual radiological contamination in the pond soils. Because radionuclides are not regulated under RCRA, and because the ORR was placed on the CERCLA National Priorities List (NPL) in 1989, RCRA closure activities were halted until a strategy could be developed to integrate CERCLA and RCRA requirements.

Further characterization of the ponds revealed that RCRA-regulated constituents were below regulatory concern, although residual low-level radiological contamination remained in the ponds' soils. In accordance with CERCLA guidance, a RI/FS (Remedial Investigation/Feasibility Study) was conducted, a RCRA clean closure was approved by TDEC and a remedial alternative selected to address this residual contamination. Beginning in 1994, the ponds were filled with gravel and soil, given a vegetative layer, and seeded.

Waste Characteristics: Wastewaters that entered the pond were discharges from the K-1407-A Neutralization Pit containing organics and metal hydroxide precipitates generated from the neutralization process. In addition the following wastes were likely discharged into the pond from various operations in K-1420: uranium compounds, traces of transuranics, organic degreasers, and oils, including some containing PCBs. The sludge was removed from the pond in 1988 and either fixed in concrete or stored.

Release Data: This was an unlined pond that contained hazardous materials for more than 40 years. Residual oil contamination exists at this unit. Groundwater monitoring data collected to date indicate that contamination in the area has migrated from other units upgradient of the B-Pond.

Site Status: The unit is closed and posted as an underground contamination area. This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Groundwater

Comments:

References:

Remedial Action Report for the K-1407-B Holding Pond and K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1371 & D0, Martin Marietta Energy Systems, Incorporated.

Remedial Design Report for the K-1407-B Holding Pond and K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1155 & D2, Martin Marietta Energy Systems, Inc., March 1994.

Record of Decision for the K-1407-B/C Ponds at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/02-1125 & D3, Radian Corporation, Oak Ridge, Tennessee, September 1993.

Remedial Design/Remedial Action Work Plan for the K-1407-B Holding Pond and the K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1113 & D2, Martin Marietta Energy Systems, Inc., February 1994.

Remedial Investigation/Feasibility Study for the K-1407-B/C Ponds, DOE/OR-1012 & D3, Radian Corporation, Oak Ridge, Tennessee, 1992.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., December 1988.

Date Prepared: April 1987

Date Revised: June 1995

K/PH94-8213

K-1407-B Holding Pond

Unit Name: K-1407-C Retention Basin

Unit Number: R039

Project Status: RCRA/CERCLA

Unit Location: K-25 Site Main Plant Area, west of K-1070-B Old Classified Burial Ground and northeast of K-25 Building

Approximate Dimensions and Capacity: Approximately 720 ft long by 75 ft (average); capacity; average depth 8 ft; about 4 million-gal capacity

Dates Operated: 1973–1988

Present Function: A closure of the pond began in 1994 and was completed in early 1995. The pond has been filled, capped, seeded, and posted as an underground radioactive contamination area.

Life Cycle Operation: The K-1407-C Retention Basin was initially opened in 1973 for the storage of potassium hydroxide scrubber sludges and for sludges dredged from the K-1407-B Retention Basin. The sludge from K-1407-B consisted primarily of precipitates generated at the K-1407-A Neutralization Pit.

To satisfy requirements of the 1984 Hazardous and Solid Waste Amendments (HSWA), the discharge of all wastes into the K-1407-B/C ponds ceased before November 1, 1988. Between 1987 and 1989 waste sludge was excavated from the ponds in anticipation of their closure as RCRA-regulated units. Verification sampling conducted after sludge removal confirmed the presence of low-level residual radiological contamination in the pond soils. Because radionuclides are not regulated under RCRA, and because the ORR was placed on the CERCLA National Priorities List (NPL) in 1989, RCRA closure activities were halted until a strategy could be developed to integrate CERCLA and RCRA requirements.

Further characterization of the ponds revealed that RCRA-regulated constituents were below regulatory concern, although residual low-level radiological contamination remained in the ponds' soils. In accordance with CERCLA guidance, a RI/FS was conducted, and a remedial alternative selected to address this residual contamination. A RCRA clean closure was granted by TDEC, and beginning in 1994, the ponds were filled with gravel and soil, given a vegetative layer, and seeded.

Waste Characteristics: Wastewaters that entered the pond were sludges from the K-1407-B Holding Pond containing organics and metal hydroxide precipitates generated from the neutralization process. In addition the following wastes were likely discharged into the pond from various operations in K-1420: uranium compounds, transuranics, organic degreasers, and oils, including some containing PCBs. The sludge was removed from the pond in 1988 and either fixed in concrete or stored.

Release Data: This unit was an unlined impoundment. Samples collected to date indicate that during its 15-year lifetime, sludge constituents such as metals and radioactivity have contaminated the soil beneath the pond.

Site Status: This unit has been closed and posted as an underground radiological contamination area. This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Groundwater

Comments:

References:

Remedial Action Report for the K-1407-B Holding Pond and K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1371 & D0, Martin Marietta Energy Systems, Incorporated.

Remedial Design Report for the K-1407-B Holding Pond and K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1155 & D2, Martin Marietta Energy Systems, Inc., March 1994.

Record of Decision for the K-1407-B/C Ponds at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/02-1125 & D3, Radian Corporation, Oak Ridge, Tennessee, September 1993.

Remedial Design/Remedial Action Work Plan for the K-1407-B Holding Pond and the K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1113 & D2, Martin Marietta Energy Systems, Inc., February 1994.

Remedial Investigation/Feasibility Study for the K-1407-B/C Ponds, DOE/OR-1012 & D3, Radian Corporation, Oak Ridge, Tennessee, 1992.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Data Evaluation Technical Memorandum on the K-1407-C Retention Basin at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-40, Martin Marietta Energy Systems, Inc., October 1991.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., December 1988.

Date Prepared: April 1987

Date Revised: June 1995

K/PH94-2365

K-1407-C Retention Basin

Unit Name: K-1407-C/K-1417 Soils

Unit Number: R012

Project Status:

Unit Location: K-25 Site Main Plant Area, immediately north of the K-1407-C Retention Basin

Approximate Dimensions and Capacity: The contours of the K-1407-C soil are indistinguishable from those of the K-1417 soil. The total combined dimensions of the K-1407-C and K-1417 soil piles are $150 \times 50 \times 10$ ft; the total combined volume of soil is estimated at 1535 m^3 .

Dates Operated: 1985–present

Present Function: Waste pile of soil contaminated with uranium. A vegetative cover of grass and weeds has developed. The area has been posted as an underground radioactive contamination area.

Life Cycle Operation: Soils excavated during site preparation for the K-1419 Sludge Fixation Facility in 1985 were hauled and dumped upgradient of the K-1407-C pond. Although contaminated soil was discovered during this excavation, only uncontaminated soil was carried to this area. This smaller pile of soil is known as K-1407-C soil.

K-1417 soil, located to the east of the K-1407-C soil, came from excavation of the K-1417-B storage pad. Again, only uncontaminated soils were authorized for placement in this area. This portion of the soil has not been surveyed.

An estimated 40 percent of spoil dirt in this area has been determined to be “other contractor” dumping.

Waste Characteristics: Uranium. The amount of radioactivity in the K-1407-C soil has been estimated at 60 pCi/g.

Release Data: No known releases

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: K-1407-C Soil is also known as Rusty’s Mountain. K-1417 Soil, although comprising the eastern portion of the total soil pile, is known as West Overlook or West Mountain. Collectively they are also known as K-1407-C upgradient soils.

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, Contamination in Well UNW-6, Upgradient of K-1407-C Pond, ORGDP, Oak Ridge, Tennessee, K/HS-159, Martin Marietta Energy Systems, Inc., December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K-1407-C/K-1417 Soils

Unit Name: K-1410 Neutralization Pit

Unit Number: R011

Project Status:

Unit Location: K-25 Site Process Plant Area, across Poplar Road from the K-1401 Plating Facility

Approximate Dimensions and Capacity: The concrete pit has a capacity of approximately 15,800 gal and dimensions of approximately 15 ft² and 10 ft deep.

Dates Operated: 1963–1979

Present Function: The pits are inactive. The area is posted with “Confined Entry” and “Danger, Keep Out” signs.

Life Cycle Operation: Neutralization of corrosive waste waters from the nickel plating process. This site includes the following five parts: the concrete neutralization pit; the limestone pit; the pipe leading from the K-1410 building to the concrete pit; the pipe leading from the concrete pit to the limestone pit; and the bank from the limestone pit to the creek. The limestone pit was installed in 1963 to neutralize discharges from plating activities. The 15,800-gallon concrete neutralization pit was installed as an upgrade of the original pit in 1975. Discharges from this newer, concrete pit discharged into the original pipeline and exited into Poplar Creek at the older limestone pit. The neutralized discharge flowing into Poplar Creek was permitted under the NPDES program during the entire operation of the newer pit.

Waste Characteristics: Acids and bases used in the nickel plating process. During a 1994 radiological walkover survey, an area adjacent to the pit was found to have radioactive contamination in the soil. The area has been roped off and posted as a soil contamination area.

Release Data: No uncontrolled releases

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Groundwater and soil

Comments:

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1410 Neutralization Pit, ORGDP, Oak Ridge, Tennessee, K/HS-138, 1, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, May 1989.

RCRA Investigation Plan K-1031 Waste Area Grouping, ORGDP, Oak Ridge, Tennessee, K/HS-160, October 1988.

Geraghty & Miller, Inc., Revised Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/SUB/85-22224/12, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, December 1989.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K-1410 Neutralization Pit

Unit Name: K-1410 Plating Facility

Unit Number: C006

Project Status:

Unit Location: K-25 Site Process Plant Area, just west of the south end of the K-25 Building

Approximate Dimensions and Capacity: This is a two-story, high-bay building with floor space of 9000 ft². Two spray facilities at the west end of the building each included stainless steel tanks measuring 8 × 25 ft and 2 ft deep.

Dates Operated: 1944–1979

Present Function: The building is inactive. The doors have been locked, and the building has been posted with radiological and asbestos hazard warning signs. Equipment is still in place.

Life Cycle Operation: From 1944 to 1946, and from 1955 to 1962, K-1410 Building was used for receiving, emptying and refilling spent cascade traps from the K-25 Building. From 1946 to 1962 K-1410 was used for decontamination of uranium-contaminated equipment and for recovery of uranium from feed plant ash. From 1963 to 1979 the building was used for nickel plating. During uranium decontamination work, two spray facilities were in use on the west end of the building. The spray facilities' two stainless steel tanks were placed in separate pits with floor pans. The pits were filled with concrete in 1963.

K-1410 is a high-bay structure with a reinforced concrete building frame and steel truss roof supports. Siding is corrugated transite, and the floor is concrete with a below-grade pit in the south-central sector. The west end of the building is partitioned with concrete masonry unit walls and concrete intermediate roof. The high bay areas contain abandoned process equipment, including a bridge crane, empty basins formerly containing acids, plating solutions, tanks, piping, and pumps. The partitioned area contains rest rooms, selenium rectifiers and switchgear. There have been undocumented modifications to the K-1410 facilities.

Waste Characteristics: Wastes generated from uranium decontamination and recovery operations included nitric acid; organic degreasers including carbon tetrachloride, trichloroethylene and perchloroethylene; MFL (Miller's Fluorinated Lubricating) oil; uranium compounds and transuranics. Cleaning solutions were routinely discharged into the building's process drains. Degreasers were occasionally discharged down the drains. Wastes generated from the plating process include alkaline cleaners, acids, and nickel sulfate and fluoride. A radiation survey conducted in Fiscal Year 1994 identified an area of low contamination outside the existing posted area of high contamination.

Release Data: A radiologically contaminated area outside the building has been roped-off and posted.

Site Status: Remediation of this area is planned as an integrated decontamination and decommissioning/remedial action CERCLA action. This unit is currently under the purview of the Inactive Waste Sites Surveillance and Maintenance Program. This unit is also part of the Decontamination and Decommissioning Program.

Media of Concern: Equipment and building surfaces

Comments: The equipment will be tested to determine if residual quantities of hazardous substances remain on or in the equipment. There are classification concerns associated with this facility.

References:

RCRA Facility Investigation Plan K-1410 Building ORGDP, Oak Ridge, Tennessee, K/HS-155, December 1988.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: April 1987

Date Revised: May 1995

K/PH87-0611

K-1410 Plating Facility

Unit Name: K-1413 Laboratory Engineering

Unit Number: D002

Project Status:

Unit Location: Due east of K-302, southeast of the intersection of 16th Street and Avenue J.

Approximate Dimensions and Capacity: 8512 ft²; the entire K-1413 complex occupies a land area of about 200 × 200 ft.

Dates Operated: The building operated as a research and development facility from 1952 to 1985 and then as a maintenance shop into the early 1990s.

Present Function: Inactive

Life Cycle Operation: The K-1413 facility was built and put into operation as a research and development facility in the early 1950s. In the late 1960s, an annex and second pit was added to the facility. In 1974–75 the south pit was installed to treat and dispose of classified wastes. A pumping station just north of the building was installed at this time.

K-1413 is a two-story, steel frame, brick and concrete structure with an attached metal building addition. The first level of the main building contains a welding and machine shop that is no longer in use, change rooms and a rest room, offices, and two abandoned high bay areas. One high-bay room contains surplus equipment; the other an abandoned research and development process. The second level of the main building contains several abandoned offices, an electrical room, catwalks around the high bays, and an abandoned laboratory. The metal building additions consist of a high bay room, single level structure, and a shed area on the east side of the main building.

Waste Characteristics: Organics, uranium compounds, mercury, and other metals

Release Data: A 2-1/2 ton tails cylinder was released at the building when a valve screwed off the cylinder. Contamination to the outside is possible, although almost all contamination would have been limited to the building. Wastes were routinely discharged into three nearby pits. The disposition of waste from these pits is discussed under K-1413 Process Lines and K-1413 Treatment Tank.

Site Status: Integrated Decontamination and Decommissioning/Remedial Action project

Media of Concern: Internal building surfaces and equipment

Comments: There are classification concerns associated with this facility.

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1413 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-144, Martin Marietta Energy Systems, Inc., February 1988.

Date Prepared: May 1995

K-1413 Laboratory Engineering

Unit Name: K-1413 Treatment Tanks and Process Lines

Unit Number: R015 and R059

Project Status:

Unit Location: Process Plant Area, due east of Section K-302 of the K-25 Building, southeast of the intersection of 16th Street and Avenue J

Approximate Dimensions and Capacity: The K-1413 Complex occupies a land area of approximately 200×200 ft, with a building footprint of approximately 7200 ft². The complex includes three tanks exterior to the building structure: K-1413-C Neutralization Pit to the south of the building, capacity approximately 21,000 gal; one pit to the north of the building, capacity 2500 gal; one pit to the east of the building, capacity 2500 gal.

Four-inch diameter plastic pipes run approximately 225 linear feet from the three K-1413 pits to the pump station. A three-inch header runs approximately 1150 linear feet from the pump station to the K-1401 Acid Line.

Dates Operated: The K-1413 complex was an operative research and development facility from the early 1950s to 1981 and 1982. The site currently continues to serve field maintenance shop operations.

Present Function: The entire K-1413 area has been fenced. A RCRA closure has been completed for the south pit. The north and east pits have been covered and sandbagged to prevent rainfall from entering.

Life Cycle Operation: The K-1413 site was built and put into operation as a research and development facility in the early 1950s. Originally the K-1413 site consisted of only the K-1413 Building and the east pit. In the late 1960s an annex was added to the K-1413 Building, and the north pit was installed. In 1974 and 1975, the south pit was added to isolate the treatment and disposal of classified waste. A pumping station, located just north of the K-1413 Building, was also built at this time, and process drains connected this station to the north pit, the east pit, and the K-1407-A/B Neutralization and Holding Pond Facility. The south pit was not connected to the K-1413 Building; however, a process drain allowed the transfer of waste streams from the north pit to the south pit when a valve between the north pit and the pumping station was closed. This transfer was driven by a pump located at the north pit. The wastes were then pumped from the south pit into a tanker truck and transported to the K-1407-C Retention Basin. Prior to 1974 and 1975, the waste streams from the north and east pits discharged by gravity flow into the storm sewer systems which are located on the east and west sides of the K-1413 Building. In 1981 and 1982, the north pit pump was deactivated, and the process drain between the north pit and the south pit was cut and capped.

A variety of activities have been carried out in the K-1413 Building since the facility was put into operation. An early K-1413 development project involved the fluorination of uranium metal chips to UF₆. The chips were immersed in perchloroethylene and shipped to the K-1413 facility in 55-gal drums. Interviews revealed that spills of perchloroethylene occurred at the facility.

UF₆ was accidentally lost to the stack in at least one incident. Due to the dispersion of UF₆ to UO₂F₂, any uranium released during the incident would not have remained at significant levels within the K-1413 area. Wastes from the annex were discharged into the storm drains or later pumped to K-1407-A or K-1407-B from the north pit. This practice was discontinued and wastes were then transferred from the north pit to the south pit, pumped from the south pit into a tanker truck, and transported to the K-1407-C Retention Basin.

The fluoride volatility development program used depleted and slightly enriched uranium oxide in zirconium-clad fuel elements. The process included removal of the zirconium-clad material in a fluidized bed using hydrogen chloride. Other steps in this program included conversion of UO₃ to U₃O₈ using an oxygen/nitrogen mixture and fluorination of U₃O₈ to UF₆ using elemental fluorine. The UF₆ was cold-trapped and off-gases produced in the various processes were passed through a filter and then scrubbed with sodium or potassium hydroxide solutions, which would have been discharged to the east pit when spent.

Other development projects included the following:

Investigation of compressors for pumping fluorine and uranium hexafluoride,
reduction of UO_3 to UO_2 using hydrogen and vibrating trays, conversion of UO_2 to UF_4 using HF,
tower fluorination of UO_2 or UF_4 to UF_6 ,
calcination of uranyl nitrate to U_3O_8 ,
hydration of normal assay UO_3 with solutions of NH_4OH for specific crystal formation,
separation of boron isotopes by extraction using anisole (an ether),
trapping of fission products such as antimony, tantalum, titanium, and ruthenium from UF_6 reactor returns
(Hanford recovered spent fuels).

Chemicals used in other programs include sulfuric and hydrochloric acids, organic acids, nickel compounds, and sodium and calcium hydroxide. The K-1413 Facility was also used as a pilot plant to demonstrate the separation technology of radioactive noble gases (e.g., krypton and xenon). These development operations would have resulted in the discharge of sulfuric, hydrofluoric, nitric, and hydrochloric acids and sodium and calcium hydroxides. Organic acids and other organics, such as diethylene glycol and dibutyl ether, and metal fluorides, including sodium, chromium, nickel, uranium, and copper, would also have been included in the waste stream. The major sources of these wastes were the laboratory on the mezzanine and the sink on the main floor in Area A, which drained to the east pit. The cleaning of containers of tungsten and rhenium hexafluoride would have resulted in waste solutions (oxyfluorides, etc.) of these materials in the K-1413 Laboratory.

In addition to the waste generated at the K-1413 Building, the K-1413 Neutralization Pits were also used to treat classified waste streams from the K-1231 and K-1232 Facilities. Wastewater transported by tankers from the Y-12 Plant has also been treated at the south pit during the operations history of the K-1413 Facility. Records indicate that one shipment of Y-12 wastewater contained 2.7 mg/L of mercury. Sodium sulfide was used at the south pit in the treatment of the wastewater, and the waste was transferred to the K-1232 Facility for further treatment. Because follow-up samples of rainwater which collected in the south pit contained traces of mercury, the rainwater was collected and transferred to the K-1232 Facility for treatment. Further follow-up samples showed no mercury contamination. The east and north pits at the K-1413 site were originally separated into two halves by 4-in.-thick baffles which came within approximately 6 in. of the bottom of the pits. Both halves of the pits were then filled with limestone gravel. The waste stream entered near the top of the pit and was forced by the baffle to percolate down through one half and back up the other half of the pit before it was discharged. Wastes generated in the laboratory on the mezzanine and in the ground floor areas A and B of the K-1413 Building were treated in the east pit, and wastes generated in area C were treated in the north pit using this limestone neutralization process. The limestone was removed from the pits when the pumping station was installed. Since 1973 and 1975, the east pit has received waste from a 20 percent potassium hydroxide scrubber. The wastes were transferred to the pit when the solution was depleted to 10 percent KOH. The waste solution included hydroxides of tungsten, rhenium, and uranium, as well as high fluoride ion content.

Limestone and/or residuals from the east or north pits is thought to have been disposed of in the K-1070-C/D Classified Burial Ground beginning in 1975-76.

Waste Characteristics: The volume and composition of the chemicals processed during the facility's life cycle operations varied with time. The chemicals used in the various K-1413 operations are not available; the following is a partial list of possible contaminants. Records of the quantities and concentrations of the chemicals listed below are not available.

uranium tetrafluoride
uranium hexafluoride
uranium oxide
perchloroethylene
antimony
tantalum
titanium
zirconium
fluorine
uranyl nitrate
NH₄OH
anisole

nickel
ruthenium
diethylene glycol
dibutyl ether
sulfuric, hydrochloric, nitric, and organic acids
nickel, copper, chromium, hydrogen and sodium
fluorides
hydrogen chloride
tungsten, rhenium, uranium sodium, calcium, and
potassium hydroxides
tungsten and rhenium hexafluorides
mercury

Release Data: Beyond the spills and stack release noted in the Life Cycle Operations section, no records of other incidents are available. Due to the earlier practice (prior to 1974 and 1975) of allowing waste streams from the north and east pits to discharge into the areas storm sewer network, it is conceivable that contamination of soil and groundwater via the underground piping system may have occurred.

Additional environmental data are available for storm drains SD-210 and SD-200 and four groundwater monitoring wells.

Site Status: This unit is under the purview of the Inactive Wastes Sites Surveillance and Maintenance Program.

Media of Concern: Soil, groundwater, storm drains

Comments:

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1413 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-144, Martin Marietta Energy Systems, Inc., February 1988.

Resource Conservation and Recovery Act Closure Plan for K-1413 Treatment Tank, K/HS-332, 2, IT Corporation, March 1991.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Date Prepared: August 1987

Date Revised: May 1995

K/PH91-3139

K-1413 Treatment Tanks and Process Lines

K/PH91-3117

K-1413 Treatment Tanks and Process Lines

K/PH91-3140

K-1413 Treatment Tanks and Process Lines

Unit Name: K-1414 Garage Diesel Tank

Unit Number: U008

Project Status: UST (underground storage tank)

Unit Location: K-25 Site Main Plant Area, north of the K-1414 garage

Approximate Dimensions and Capacity: 12,600 gal

Dates Operated: 1950s to 1987

Present Function: The tank has been removed.

Life Cycle Operation: In January 1987 inventory discrepancies in the diesel fuel tank indicated an estimated loss of 1000 gal of No. 2 diesel fuel. On February 25, 1987, a Petrotite test indicated the diesel was leaking at approximately 2 gal/day. Subsequent tests revealed that the leak was from connected service pipes; it is unknown how long the leak had been occurring. The tank contents were pumped out, and the tank was removed on March 3, 1987. An estimated 300–600 gal of diesel fuel was recovered, but an unknown amount remains in the ground.

Waste Characteristics: Diesel fuel

Release Data: From an undetermined time through February 1987, the diesel tank lines leaked an undetermined amount of diesel fuel into the ground. The tank was removed, and as much leaked fuel was cleaned up as was possible. This is the only known release of material from this unit.

Site Status: Corrective action is planned for this unit.

Media of Concern: Soil and groundwater

Comments: This unit was previously reported as part of K-1414 Gas Tanks report (U001).

References:

Environmental Reassessment Report and Corrective Action Plan Addendum for the K-1414 Underground Storage Tank Site at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-118 (3 volumes), Martin Marietta Energy Systems, Inc., December 1993.

Preliminary Assessment of the K-1414 Diesel Fuel Release, K/SUB/22224C/8, January 1988.

Environmental Assessment for In Situ Bioremediation of Diesel Fuel Contamination at the K-1414 Tank Site, Oak Ridge K-25 Site, Oak Ridge, Tennessee, K/ER-36, November 1990.

Operation and Maintenance Manual, Petroclean Bioremediation System, Model Number: BR 4000, K/ER/SUB-90/QU129/8, October 1990.

Environmental Assessment Report for the K-1414 Leaking Underground Storage Tank Remedial Investigation, K/SUB/88-AB317V/1, January 1989.

Quality Assurance/Quality Control (QA/QC) Project Plan for the Bioremediation of the K-1414 UST Site at Plant K-25, ORGDP in Oak Ridge, Tennessee, K/ER/SUB-90/QU129/7, October 1990.

Project Health and Safety Plan for the Biological Remediation of the K-1414 UST Site at the ORGDP, Oak Ridge, Tennessee, K/ER/SUB-90/QU129/6, September 11, 1990.

Final Report, Design of In Situ Bioreclamation System at the ORGDP K-1414 Site, Oak Ridge, Tennessee, May 1990, K/ER/SUB-90/QU129/5.

Work Plan, Health and Safety Plan, and Quality Assurance Project Plan for K-1414 Underground Storage Tank, K/ER-38, unpublished draft.

Date Prepared: April 1987

Date Revised: January 1995

K-1414 Garage Diesel Tank

Unit Name: K-1417 Block Casting/Storage Area

Unit Number: R033

Project Status: RCRA

Unit Location: K-25 Site Main Plant Area, north of the K-1420 Building and east of the K-1407-C Retention Basin

Approximate Dimensions and Capacity: 3 acres; capacity approximately 2 million gal

Dates Operated: 1987 to present

Present Function: Closeout of Pond Waste Management Program (PWMP) repackaging activities

Life Cycle Operation: Prior to its use as a drum storage yard, the only official operation on this site was a construction hutment community, 1943–44. Although there were no official waste discard sites or burial ground in this immediate area, signs of unauthorized radioactive waste discards were discovered during excavation for the western portion of this unit, the K-1417-A yard, in March 1985. At that time radioactive contamination was discovered in an approximately 50 × 50 ft area at the southwest end of the A yard. On average, samples revealed the soil contained 78 ppm uranium at average assay of 1.2 percent ²³⁵U. This concentration is equal to 68 pCi/g. An estimated 641 yd³ of soil was removed and stored in an area east of K-1417 before being hauled to the Oak Ridge Y-12 Plant for burial. Other than contaminated soil, construction of the A yard was a cut-and-fill operation that required no further removal of soil from the construction area.

Construction of the K-1417 eastern expansion, known as K-1417-B, began in 1986 and was completed in 1987. Site preparation produced many cubic yards of spoils, which were hauled to an area north of the K-1407-C Pond known as West Mountain or West Overlook (see K-1407-C and K-1417 Soils, R012). These excavations revealed an old fire water line, terra cotta pipe, a concrete culvert head and an area of unstable soil, apparently from land clearing and soil disposal from an earlier period. No contaminated material was identified.

Beginning in 1987, sludges from the K-1407-B and -C ponds were dredged and either fixed in concrete or poured directly into 55-gal drums that were stored on the K-1417 yard. Repackaging began in 1993, and by late 1994 all drums had been repackaged and removed from the yard. Closeout activities are continuing.

Waste Characteristics: Listed wastes included 45,776 drums of pond sludge fixed in concrete, and roughly 32,000 drums of raw sludge. Sludge wastes were generated from a plating process and also contain radioactive constituents. Analyses of sludges were reported in the documents listed below.

During excavation for this pad, a material resembling yellow cake was discovered in the dirt. When surveyed, it was found to emit 9000–10,000 pCi/g. The disposition of this particular material is unknown; however, contaminated soils from this excavation were disposed of at the Y-12 Plant.

Release Data: Drums of sludge from the K-1407-B Holding Pond are known to have leaked and been spilled onto the drum storage pad.

Site Status: This unit is under the purview of the Pond Waste Management Program.

Media of Concern: Soil, groundwater

Comments: This unit is also known as the Concrete Block Casting Yards, Drum Storage Yard, and Drum Storage Yards.

References:

RCRA Closure Plan for the K-1417 Concrete Block Casting and Storage Area and the K-1419 Sludge Fixation Facility at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR-1076 & D1, Martin Marietta Energy Systems, Inc., Oak Ridge, March 1995.

K-1417 Drum Storage Yard and K-1419 Sludge Fixation Facility Equipment and Facilities Removal Plan, K/PW-33&D3, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, March 1995.

Shipments of Radioactively Contaminated Dirt from K-25 to the Y-12 Low-Level Radioactive Burial Ground, Martin Marietta Energy Systems internal correspondence from M. L. Ambrose to W. R. Golliher, Oak Ridge Gaseous Diffusion Plant, September 9, 1985.

Clinton Engineer Works, Clinton, Tennessee, Area K-25 Camp Site General Layout, Drawing No. F-3456-48, August 29, 1943, Rev. 8, Ford, Bacon, and Davis, Inc., August 17, 1944.

Date Prepared: April 1987

Date Revised: March 1995

K-1417 Block Casting/Storage Area

Unit Name: K-1419 Sludge Fixation Plant

Unit Number: R032

Project Status: RCRA

Unit Location: K-25 Site Main Plant Area, west of the K-1420 Building

Approximate Dimensions and Capacity: Sludge receiving hopper, 2600 gal; high solids storage tank, 3000 gal; waste sludge feed hopper, 1500 gal; low solids storage tank, 15,000 gal; liquid waste feed tank, 1500 gal; remedial sludge storage tank, 15,000 gal; neutralization tank, 550 gal; remedial sludge feed tank, 15,000 gal; TILT mixer, 10 yd³; high energy mixer, 7.5 yd³.

Dates Operated: 1987–1988

Present Function: Inactive

Life Cycle Operation: The facility was used to fix sludge from the K-1407-B Holding Pond and K-1407-C Retention Basin in concrete. 45,776 barrels from the two ponds were treated at the site. Sludges from K-1232, TSCA (Toxic Substances Control Act) Incinerator ash, and Oak Ridge Gaseous Diffusion Plant thickener sludge were also treated at the facility, along with wastes from the Y-12 West End Treatment Facility and Central Pollution Control Facility. Radioactively contaminated soils were discovered during construction of this facility. Noncontaminated soils were disposed of north of the K-1407-C Retention Basin and are described in this document under K-1407-C/K-1417 Soils.

Waste Characteristics: Waste treated at the facility included wastewater treatment sludges and D004 through D011 characteristically listed hazardous sludges. K-1232 sludges and TSCA incinerator ash were derived from the treatment of listed wastes F001, F002, and F006. Other wastes were listed waste F006. During excavation activities for this unit, contaminated soils were discovered and hauled for disposal at the Oak Ridge Y-12 Plant.

Release Data: There is an appreciable amount of sludge on the exterior of this facility.

Site Status: This unit is part of the Pond Waste Management Program.

Media of Concern: Equipment and pad

Comments:

References:

Date Prepared: April 1987

Date Revised: March 1995

K-1419 Sludge Fixation Plant

Unit Name: K-1420 Contaminated Drum Storage

Unit Number: C067

Project Status:

Unit Location: K-25 Site Main Plant Area, immediately north of the K-1420 Building

Approximate Dimensions and Capacity: 20 × 20 ft; approximately 100 drums

Dates Operated: mid 1970s to late 1980s

Present Function: Inactive

Life Cycle Operation: Drums of low-level radioactively contaminated metal and wood scrap were stored at the site prior to disposal.

Waste Characteristics: Low-level radioactively contaminated scrap metal and wood stored in drums

Release Data: No known releases

Site Status: This unit is not managed as a discrete area apart from the general site area surveillance and maintenance.

Media of Concern: None.

Comments: This area stored drums that contained solid contaminated scrap metal materials only.

References:

Date Prepared: October 1987

Date Revised: June 1995

K/PH87-3113

K-1420 Contaminated Drum Storage

Unit Name: K-1420 Decontamination and Uranium Recovery

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area, inside the K-1420 Building

Approximate Dimensions and Capacity: 523 × 163 × 48 ft; 94,549 ft² floor area

Dates Operated: 1954–1993

Present Function: Decontamination activities have been discontinued.

Life Cycle Operation: The following uses were made of the K-1420 Building: furnace stand for converter conditioning and recovery, mercury recovery, MFL (Miller's Fluorinated Lubricating) oil reclaiming, classified parts disassembly and cleaning, cascade and feed plant cleaning and decontamination, uranium recovery, aluminum leaching and laboratory. In the 1960s a nickel plating facility was operated. From the 1970s to 1987 a converter bundle cleaning and barrier removal facility was in operation for equipment from the enrichment cascades. In 1983 an MFL oil reclamation project that treated uranium-containing oil with quinoline was put into operation. The floors of K-1420 are concrete. The walls are cinderblock up to the 8-ft level, after which they are corrugated asbestos siding. Small-scale operations were carried out until 1993.

Waste Characteristics: Uranium, mercury, nickel, semi-volatile organics, corrosives, detergents, PCBs (polychlorinated biphenyls), and trace amounts of transuranics were all present in the building. Asbestos siding is a contaminant of concern at demolition.

Release Data: Hazardous wastes at the K-1420 Building were routinely released through process lines discussed in the K-1420 Process Lines write-up.

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Building surfaces and equipment

Comments: This unit is also known as K-1420 Plating and Decontamination Shops. There are classification concerns associated with this unit.

References:

Final Safety Analysis Report for the Oak Ridge Gaseous Diffusion Plant, K/D-5604, March 1985.

Phase I Hazard Screening Analysis for K-1420 Decontamination and Uranium Recovery Facility, HS/K-1420/PK/79.2/R0, March 1992.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1420 Mercury Room, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-139, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1987.

R. W. Brandenburg, Report of Non-Destructive Assay Testing in Building K-1420, NDA-94-184, Technical Division, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1994.

Date Prepared: May 1995

K-1420 Decontamination and Uranium Recovery

Unit Name: K-1420 Mercury Recovery Room

Unit Number: R012

Project Status:

Unit Location: K-25 Site Main Plant Area within a small room on the north side of Building K-1420

Approximate Dimensions and Capacity: 15 × 15 ft

Dates Operated: 1960s to early 1980s

Present Function: Inactive

Life Cycle Operation: This room contained equipment that was used to clean and recover used mercury.

Waste Characteristics: Mercury solutions on ventilation hoods, distillation equipment and other equipment

Release Data: Mercury was found in the room's center floor drain when the line was accidentally punctured. The line was grouted and capped where the line exits the K-1420 Building, and the floor drain was sealed. Contents of the floor drain had previously flowed through the building's north side process lines to the K-1407-B Holding Pond.

Site Status:

Media of Concern: Equipment and air

Comments:

References:

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1420 Mercury Room, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-139, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1987.

R. W. Brandenburg, Report of Non-Destructive Assay Testing in Building K-1420, NDA-94-184, Technical Division, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1994.

Date Prepared: April 1987

Date Revised: May 1995

K/PH87-0723

K-1420 Mercury Recovery Room

Unit Name: K-1420 Oil Decontamination and Recovery Facility

Unit Number: R073

Project Status:

Unit Location: K-25 Site Main Plant Area inside the northwest portion of Building K-1420

Approximate Dimensions and Capacity: The unit occupies approximately 225 ft² diked area within a 15 × 15 ft cubicle. When in operation the unit processed approximately 500 lb per month of contaminated MFL (Miller's Fluorinated Lubricating) oil.

Dates Operated: Mid to late 1950s through the late 1960s

Present Function: Shut down

Life Cycle Operation: The MFL oil decontamination and reclamation facility consists of two similar in-line but separate mixing tank and pressure tank assemblies, both housed in one cubicle. Each assembly consists of a mixing tank, a pressure filter tank, strip heating elements, exhaust ducts and auxiliary units. Drawing K-1420-951 M shows the placement of the process equipment within its cubicle. Drawing K-1420-947 M provides details of the MFL recovery process equipment.

During the early years of plant operations, MFL oil was mostly obtained from the uranium enrichment process buildings' cold trap rooms (Beech-Russ Pumps). Initially the MFL oil was processed in the K-1303 Building. Later the recovery process was moved to K-1420 when the facility became available (approximately 1953–1954). Thereafter isolated generators of contaminated oil supported a reduced need for an MFL recovery capability.

Process-wise, contaminated oil was charged to the mixing tank and mixed with carbon tetrachloride to decrease the oil's viscosity. From the mixing tank the oil flowed to the pressure filter tank where the uranium-contaminated oil sludge was separated from the oil's clean component. The sludge was packaged in drums pending eventual treatment through the K-1420 uranium recovery process. The clean oil was transferred to the mixing tank of the second equipment assembly where cobalt fluoride was added to refluorinate the oil and restore its inertness to fluorination agents in the uranium enrichment cascade. The resultant mixture moved to the pressure filter tank where the cobaltous fluoride component was removed and stored for later treatment. The clean MFL oil was reclaimed for continued use.

Waste Characteristics: The volume of contaminated oil processed through the subject unit was minimal due to reduced generation. The oil recovery batch process handled uranium bearing oil, carbon tetrachloride and cobalt fluoride.

Release Data: No documented incidents of uncontrolled waste release(s) exist. Any release would have been contained within the cubicle enclosure and cleaned. If not cleaned, the release would have been via the floor drain within the cubicle flowing to the K-1407-B Holding Pond.

Site Status: The underground drain system that served the north area of K-1420 and includes the oil decontamination/recovery facility is currently part of a site characterization activity. No further action is planned for this unit.

Media of Concern: Soil, groundwater

Comments:

References:

RCRA Facility Investigation Plan, K-1420 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-147, Martin Marietta Energy Systems, Inc., February 1988.

Work Plan, Health and Safety Plan, and Quality Assurance Project Plan for K-1420 Waste Area Grouping, K/ER-34, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 1991.

Oak Ridge Gaseous Diffusion Plant, RCRA Facility Investigation Plan, K-1407 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-135, Martin Marietta Energy Systems, Inc., December 1988.

Plan Area No. I, US AEC Drawing No. K-1420-95 M, Smith, Hinchman & Grylls, Inc., October 12, 1953.

MFL Recovery Room Misc. Equipment Details, US AEC Drawing No. K-1420-947 M, Smith, Hinchman & Grylls, Inc., October 12, 1953.

R. W. Brandenburg, Report of Non-Destructive Assay Testing in Building K-1420, NDA-94-184, Technical Division, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, November 1994.

Date Prepared: May 1991

Date Revised: May 1995

K-1420 Oil Decontamination and Recovery Facility

K/PH91-3119

Unit Name: K-1420 Oil Storage

Unit Number: R010

Project Status:

Unit Location: K-25 Site Main Plant Area, on the north side of the K-1420 Building

Approximate Dimensions and Capacity: 275 × 50 ft

Dates Operated: Late 1950s–mid 1980s

Present Function: The area is no longer used for oil storage. Radiologically contaminated materials were removed. The unit is covered in asphalt and grass.

Life Cycle Operation: Drums of waste uranium cascade motor lubricant oil, containing 2–3 percent uranium, have been stored in this area. Also, uranium solutions, stored in safe geometry dollies, were stored at the facility. Through 1994 the unit was used to store radiologically contaminated materials.

Waste Characteristics: Uranium contaminated waste oil, including PCBs

Release Data: There is evidence of oil having leaked from the drums. Before the Northeast Patrol Road was asphalted, storm water runoff flowed directly from the oil storage site into K-1700 Stream. Surface drainage from the site now goes into a storm drainage ditch running along the patrol road before discharging into K-1700 Stream.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: Results of RFI (RCRA facilities investigation) sampling can be found in the K-1420 project file, data evaluation prepared by Science Applications International Corporation (SAIC) and modifications to the work plan (K/ER-34) prepared by SAIC. Sampling data resulting from the RFI have been submitted to the Oak Ridge Environmental Information System (OREIS).

References:

Date Prepared: April 1987

Date Revised: May 1995

K-1420 Oil Storage

Unit Name: K-1420 Process Lines

Unit Number: R016

Project Status:

Unit Location: K-25 Site Main Plant Area, in the northeast quadrant of the plant, north of the K-1420 Building and east of the K-25 Building

Approximate Dimensions and Capacity: Several underground pipes approximately 300 ft long

Dates Operated: 1953–1994

Present Function: Transfer of waste water from the K-1420 Decontamination Building to the Central Neutralization Facility

Life Cycle Operation: When opened in 1953, the following uses were made of the K-1420 Building: furnace stand for converter conditioning and recovery, mercury recovery, MFL (Miller's Fluorinated Lubricating) oil reclaiming, classified parts disassembly and cleaning, cascade and feed plant cleaning and decontamination, uranium recovery, aluminum leaching and laboratory. In the 1960s a plating facility was operated. From the 1970s to 1987 a converter bundle cleaning and barrier removal facility was in operation for equipment from the enrichment cascades. In 1983 an MFL oil reclamation project that treated uranium-containing oil with quinoline was put into operation.

The building's south drain served K-1420's A area, which includes the degreasing, stripping, rinsing and plating areas. Effluent originally went to the K-1407-A Neutralization Pit and on to the K-1407-B Holding Pond. Later, effluent was discharged to the Central Neutralization Facility. The north drain served the B and C areas, which includes the mercury recovery and MFL oil reclamation facilities along with the K-1421 Incinerator area.

Waste Characteristics: Uranium, metals, semi-volatile organics, corrosives, detergents, and rinse waters. Traces of transuranics were reportedly disposed of in both line systems. Abandoned process lines that were discovered during the construction of new facilities have been found to contain uranium, mercury, and PCBs (polychlorinated biphenyls). The north line system was originally composed of terra cotta lines, which were replaced by stainless steel due to severe leakage. Abandoned process lines discovered during construction of new facilities have been found to contain uranium, mercury, and PCBs.

Release Data: Tests conducted in 1987 showed that process line systems on both the north and south sides of the building were leaking.

Site Status: A RCRA Facility Investigation has been conducted for this unit. This unit is currently under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Soil and groundwater

Comments: Results of RFI sampling can be found in the K-1420 project file, data evaluation prepared by Science Applications International Corporation (SAIC) and modifications to the work plan (K/ER-34) prepared by SAIC. Sampling data resulting from the RFI have been submitted to the Oak Ridge Environmental Information System (OREIS).

References:

Date Prepared: April 1987

Date Revised: May 1995

K/PH87-0721

K-1420 Process Lines

Unit Name: K-1420-B Flammable Liquid Storage

Unit Number:

Project Status:

Unit Location: Immediately south of the southeast corner of K-1420

Approximate Dimensions and Capacity: Approximately 400 ft²

Dates Operated: 1976–present

Present Function: Storage of flammable and non-flammable new materials

Life Cycle Operation: This unit was used for storage of flammable liquids for decontamination activities within K-1420. The building, which previously held a grinding operation, was found to be radioactively contaminated and was decontaminated in 1991–92.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This is an active facility and is part of the Decontamination and Decommissioning Program.

Media of Concern: None

Comments: This unit is an active facility.

References:

Date Prepared: May 1995

K-1420-B Flammable Liquid Storage

Unit Name: K-1420-C Gas Cylinder Storage

Unit Number:

Project Status:

Unit Location: Adjacent to the east external wall of K-1420

Approximate Dimensions and Capacity: 60 ft²

Dates Operated: 1953–present

Present Function: Propane cylinder storage

Life Cycle Operation: This storage area was used for storage of propane cylinders used in decontamination activities within K-1420. The storage area was found to be radioactively contaminated and was decontaminated in 1991–92.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This is an active facility and is part of the Decontamination and Decommissioning Program.

Media of Concern: None

Comments:

References:

Date Prepared: April 1995

K-1420-C Gas Cylinder Storage

Unit Name: K-1420-D Valve Sprinkler House

Unit Number:

Project Status:

Unit Location: Between buildings K-1401 and K-1037 just south of the railroad tracks

Approximate Dimensions and Capacity: 30 ft²

Dates Operated: 1940s–present

Present Function: Valve house

Life Cycle Operation: The valve house is part of a deluge sprinkler system for the K-1420-A flammable waste storage tank.

Waste Characteristics: None

Release Data: No known releases

Site Status: This is an active facility.

Media of Concern: None

Comments:

References:

Date Prepared: April 1995

K/PH95-0712

K-1420-D Valve Sprinkler House

Unit Name: K-1421 Incinerator

Unit Number: RO57

Project Status:

Unit Location: K-25 Site Main Plant Area, northwest of and within the fenced area surrounding K-1420. The incinerator itself is near the center of the building and can be seen from outside.

Approximate Dimensions and Capacity: 586 ft²; approximately 108 ft³ burner capacity

Dates Operated: 1954–1986

Present Function: The incinerator is inactive.

Life Cycle Operation: A brick incinerator was operated on the site from the 1950s to late 1960s to burn low-level contaminated combustible materials such as gloves, coveralls, wood, paper, plastic and waste oil sludge. In the late 1960s that unit was upgraded with a secondary burner and higher stack. In 1982, the upgraded unit was replaced with a unit modified to meet EPA standards. Ash was collected; uranium was leached and processed through the K-1420 Recovery Facility. The K-1421 Incinerator was shut down due to emissions exceeding EPA (Environmental Protection Agency) standards for uranium. Uranium sludge from the MFL (Miller's Fluorinated Lubricating) oil recycling project was burned in the incinerator during the 1980s.

K-1421 is a concrete block building with an attached, sheltered storage pad twice the size of the building itself. The storage pad has corrugated asbestos siding.

Waste Characteristics: Uranium wastes

Release Data: In 1985, continuous air monitoring was conducted over one eight-hour shift on each of two days, several months apart. These samples, which conformed to EPA Method No. 5, both failed on total particulates. Two floor drains inside the incinerator area and one outside are reportedly connected to the current drain line running either to K-1407-A Neutralization Pit or K-1407-B Holding Pond. The incinerator is in an area of high radioactive contamination. There is also an area of lower radioactive contamination surrounding the higher area. Places within the incinerator are extremely contaminated with radioactive components, and access to the building is limited. The asphalt pavement around the incinerator has elevated levels of radioactivity. The entire area is exposed to rainwater, and radioactivity can be transferred in surface water. Runoff from the area flows either overland to the K-1700 Stream or enters the storm drain, which also flows to the K-1700 Stream. It is thought that residual contamination on the incinerator roof and stack at K-1421, along with contamination from the oil storage yard and storm drain lines may be contaminating surface water in the vicinity, although the effect will diminish with time.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program and is also part of the Decontamination and Decommissioning Program.

Media of Concern: Soil, groundwater; building siding at demolition

Comments: Results of RFI sampling can be found in the K-1420 project file, data evaluation prepared by Science Applications International Corporation (SAIC) and modifications to the work plan (K/ER-34) prepared by SAIC. Sampling data resulting from the RFI have been submitted to the Oak Ridge Environmental Information System (OREIS).

References:

RCRA Facility Investigation Plan, K-1420 Waste Area Grouping, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-147, Martin Marietta Energy Systems, Inc., February 1988.

Work Plan, Health and Safety Plan, and Quality Assurance Project Plan for K-1420 Waste Area Grouping, K/ER-34, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 1991.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Phase I Hazard Screening Analysis for K-1421 Incinerator House and the K-1422 Storage Building, HS/K-1421/PK/81.0/R0, February 1993.

Date Prepared: June 1987

Date Revised: May 1995

K/PH91-3121

K-1421 Incinerator

Unit Name: K-1422 Storage Building

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area, north of Building K-1420 and east of the K-1421 Incinerator

Approximate Dimensions and Capacity: 322 ft²

Dates Operated: Beginning in 1953

Present Function: Inactive

Life Cycle Operation: K-1422 is a former sheltered concrete fissile material storage area and was also reportedly used for cylinder charging or emptying. The area is partially enclosed with transite siding.

Waste Characteristics: Uranium

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Foundation; siding during demolition

Comments:

References:

Phase I Hazard Screening Analysis for K-1421 Incinerator House and the K-1422 Storage Building, HS/K-1421/PK/81.0/R0, February 1993.

Date Prepared: May 1995

K-1422

K-1422 Storage Building

Unit Name: K-1423 Grease Burial

Unit Number: K-C123

Project Status:

Unit Location: K-25 Site Main Plant Area. The burial site is believed to be either east of the present K-1423 or in the field between K-1401 and the K-1501 Steam Plant.

Approximate Dimensions and Capacity: Unknown

Dates Operated: mid 1940s

Present Function: Unknown

Life Cycle Operation: Historical investigations revealed that in the mid-1940s a considerable quantity of off-specification heavy grease, in the range of EP 90 to EP 140 and used for lubrication of heavy equipment, had accumulated at the K-25 Site. The grease was the result of mixing together the products of several vendors: Texaco, Gulf, Sunoco Vacuum, Alemite, etc.). Upon using this mixture, a rash of bearing failures occurred. According to interviews with site workers from that period, the grease was buried somewhere within the K-25 Site perimeter fence.

Waste Characteristics: Heavy grease for lubricating equipment

Release Data: The degradation and dissolution of the grease in the subsurface is unknown.

Site Status: This facility is not maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Subsurface soil, groundwater

Comments:

References:

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 and K-27 Plot Plan, Rev. 3, Drawing No. AW-1M, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Date Prepared: August 1994

Date Revised: June 1995

K/PH94-3847

K-1423 Grease Burial

Unit Name: K-1501-E Crusher Transfer Building

Unit Number:

Project Status:

Unit Location: K-25 Site Main Plant Area south of the K-1501 Steam Plant

Approximate Dimensions and Capacity: 2145 ft²

Dates Operated: 1980s

Present Function: Inactive. The facility is still in place.

Life Cycle Operation: K-1501-E, a cinder block, band sheet metal structure, is made up of a coal crusher, vibrating screens, and a conveyor system. The unit was built in 1979 to process mine-run coal to provide stoker-grade coal for the K-1501 steam plant. K-1501-E was operational until the steam plant converted to gas fuel in 1990.

Waste Characteristics: No hazardous wastes

Release Data: Not applicable

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: None

Comments: The K-1501 coal conveyor has already been demolished.

References:

Date Prepared: May 1995

K-1501-E Crusher Transfer Building

Unit Name: K-1503 Neutralization Pit

Unit Number: R011

Project Status:

Unit Location: K-25 Site Main Plant Area, immediately south of the K-1501 Steam Plant, west of K-1037

Approximate Dimensions and Capacity: 15 × 18 × 15 ft; 16,000 gal capacity

Dates Operated: 1973 to 1980

Present Function: Inactive. Rainwater collecting in the pit is periodically pumped, pH tested, and discarded.

Life Cycle Operation: Beginning in the mid-1940s, the pit received waste from a chemical water softening process at the K-1501 Steam Plant. In 1973, a synthetic zeolite process was installed at the steam plant. The pit was upgraded, lined and placed in operation as a neutralization pit. This unit also includes a trench line inside the K-1501 building and an underground line connecting the trench and pit. Contents of the pit initially flowed to a nearby catch basin, then on to the K-1407-B Holding Pond. A pipe, which formerly drained from the pit to the storm drainage system, has now been capped at the pit. During the 1980s, the pit was used as a sump from which K-1501 discharge water was pumped in an aboveground line to the Central Neutralization Facility.

Waste Characteristics: Corrosive wastewaters generated from the regeneration of the zeolite water softening system

Release Data: In 1987 a leak test revealed extensive leakage from the trench and underground line. The trench was stabilized by concrete backfill, and the underground line was replaced by an aboveground line.

Site Status: This unit is awaiting demolition, capping and reseeded.

Media of Concern: Soil

Comments:

References:

Date Prepared: April 1987

Date Revised: June 1995

K/PH87-0604

K-1503 Neutralization Pit

Unit Name: K-1600 Technology Test Facility

Unit Number:

Project Status:

Unit Location: Within the "U" courtyard of the K-25 Process Building

Approximate Dimensions and Capacity: 43,180 ft²

Dates Operated: 1980–85

Present Function: The test facility is shut down, but office space is occupied.

Life Cycle Operation: The Technology Test Facility (TTF) was initially used for the development of improved gas centrifuge models through high-speed testing that included ultra high-speed turbine stands, gaseous centrifuge test stands, balance stands, and a seismic test facility used to performed simulated earthquake testing on operating centrifuges.

K-1600 is constructed of steel beams on a concrete slab with insulated metal siding and is composed of high and low bay areas. Interior partitions are of concrete masonry. Precast concrete ceiling slabs cover some of the partitioned areas within the outer walls of the building. There are two pit areas in the high bay. One is approximately 30 ft deep and contains a seismic test table mechanism. The other pit is approximately 35 ft deep and contains centrifuge balance stands and gas centrifuge test stands.

Waste Characteristics: Uranium, hydrocarbon oils, fluorocarbon oils

Release Data: No known releases

Site Status: This facility is part of the Decontamination and Decommissioning Program.

Media of Concern: Internal building surfaces and equipment

Comments: There are classification concerns associated with this facility.

References:

Surveillance and Maintenance Plan for the K-25 Centrifuge Facilities Decontamination and Decommissioning Project, FY 1993–1999.

Date Prepared: March 1995

K-1600 Technology Test Facility

Unit Name: K-1700 Stream

Unit Number: C002

Project Status:

Unit Location: K-25 Site Main Plant Area. This stream runs from the northeastern boundary part of the K-25 Site, between the K-1407-B Holding Pond and K-1407-C Retention Basin areas, and empties into Poplar Creek north of the K-25 Building.

Approximate Dimensions and Capacity: Three ft wide, 0.75 mile long

Dates Operated: This unit is a natural stream that predates the existence of the Oak Ridge Gaseous Diffusion Plant. The stream bed was altered in about 1944 and again in the mid-1980s.

Present Function: This unit is a natural stream that receives treated wastewaters from various treatment facilities and stormwater drains on the K-25 Site. Samples taken from the stream indicate that the stream-bed sediments contain hazardous constituents that are found in sludges from the former K-1407 holding pond and retention basin. A buffer zone has been established along both banks of the stream, and a wetland has been established in the area adjacent to the former K-1407-B pond.

Life Cycle Operation: This stream precedes operations at the K-25 Site. However, the stream has been rerouted from its original stream, once during plant construction, and once in the 1970s or 1980s.

Waste Characteristics: Samples collected in June 1986 indicate the presence of heavy metals, including chromium, lead, nickel, arsenic and uranium in stream bed sediments. The contaminants in the stream are similar to chemicals discharged into the K-1407-B and -C ponds.

Release Data: Wastewater from treatment units within the K-25 Site flow into this stream, which discharges into Poplar Creek. Since 1974 the stream has had an NPDES (National Pollutant Discharge Elimination System) permit at a point near its confluence with Poplar Creek. There have been occurrences when permitted parameters exceeded the discharge limits.

Site Status: This unit is under the purview of the Inactive Waste Sites Surveillance and Maintenance Program.

Media of Concern: Water and sediment

Comments: K-1700 Stream is also known as Mitchell Branch.

References:

Annual Summary Report on the Surveillance and Maintenance Program for Remedial Action Inactive Waste Sites at the Oak Ridge K-25 Site, Fiscal Year 1994, K/ER-182, K-25 Environmental Restoration Program, Martin Marietta Energy Systems, Inc., November 15, 1994.

Surveillance and Maintenance Plan for Inactive Environmental Restoration Remedial Action Sites at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Revision 2, K/ER-54/R2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995.

Toxicity Control Plan for Mitchell Branch, K/HS-354, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, May 1991.

Aerial Photograph of Future K-25 Site, Manhattan Engineer District Photograph K-25-1, 1942.

Aerial Photograph of K-25 Site, Manhattan Engineer District Photograph 281, 1945.

Date Prepared: April 1987

Date Revised: June 1995

K/PH87-0608

K-1700 Stream

Unit Name: Poplar Creek Disposal Area

Unit Number: C110

Project Status:

Unit Location: North of the Oak Ridge K-25 Site at the present location of the United States TVA Roane Substation

Approximate Dimensions and Capacity: 11 acres

Dates Operated: Early 1940s to approximately 1975

Present Function: Electrical substation. This site is now under the purview of the Tennessee Valley Authority.

Life Cycle Operation: This site was used for material storage operations and for the disposal of non-combustible building materials, concrete, asphalt, and steel in a soil matrix. Combustible materials were also disposed of by burning.

Waste Characteristics: Building rubble. Numerous employees familiar with operations at this unit were interviewed about activities there, and none was aware of any hazardous materials being disposed of at the site.

Release Data: No known releases

Site Status: This facility is now the site of a TVA electrical substation.

Media of Concern: None

Comments:

References:

Date Prepared: May 1994

Date Revised: February 1995

Poplar Creek Disposal Area

Unit Name: Round House Road

Unit Number: C112

Project Status:

Unit Location: K-25 Site Main Plant Area between Powerhouse Road and Burchfield Road

Approximate Dimensions and Capacity: 0.3 mile

Dates Operated: 1943–present

Present Function: Paved road

Life Cycle Operation: Prior to its being paved in 1994, Roundhouse Road had a gravel surface. During 1982–84, a total of 8000 gal of oil was applied to the road for dust suppression. The oil was free of uranium and met PCB (polychlorinated biphenyl) and chlorinated solvents specifications of not more than 5 ppm or 1 percent, respectively.

Waste Characteristics: Mineral oil

Release Data: No known releases

Site Status: This road is in use.

Media of Concern: Surface soil

Comments: This unit ran through the old Southern Railway Yard.

References:

K-25 Site Environmental Restoration Historical Investigations Site 34, Landfarming, Environmental Restoration Division, Lockheed Martin Energy Systems, Inc., Oak Ridge, Tennessee.

Date Prepared: August 1994

Date Revised: February 1995

K/PH94-3836

Round House Road

Unit Name: S-21 Happy Valley Service Station

Unit Number: C090

Project Status:

Unit Location: K-25 Site External Plant Area northeast of the intersection of Boulevard Road with Oak Ridge Turnpike

Approximate Dimensions and Capacity: Unknown

Dates Operated: 1940s

Present Function: Inactive grassy area

Life Cycle Operation: Happy Valley Service Station, known officially as the S-21 Gasoline Service Station, was built during construction of the Oak Ridge Gaseous Diffusion Plant to serve residents of the Happy Valley temporary housing area. The building is found on plot plans as early as 1944. Building listings and plot plans from 1951 do not show the station. The number of underground storage tanks and their disposition is not known.

Waste Characteristics: Potential wastes from 1940s gasoline are tetraethyl lead, ethylene dibromide and dichloride, sulphur, methyl and ethyl alcohol, xylene, toluene, benzene, and alpha-methyl naphthalene.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Date Prepared: January 1993

Date Revised: June 1995

S-21 Happy Valley Service Station

Unit Name: SW31 Spring

Unit Number: C098

Project Status: A CERCLA Remedial Action is underway for this unit.

Unit Location: K-25 Site Main Plant Area at the bottom of the hill west of the K-1070-C/D Classified Burial Ground

Approximate Dimensions and Capacity: The spring has an average flow of approximately 3.5 gal/min.

Dates Operated: In the mid-1970s a pipe was inserted into the hillside to capture flow from what had previously been a natural seep.

Present Function: Spring water is presently being channelled into collection tanks and taken in tanker trucks to the Y-12 Plant for disposal. Under the upcoming Phase 2 RA, the water will be pumped to the K-25 Central Neutralization Facility for treatment.

Life Cycle Operation: Shortly before the pipe was inserted into the hillside to capture water from the existing seep, disposal operations began at the K-1070-C/D burial ground. In the early 1980s, a variety of organic liquids were poured into K-1070-D pits uphill from the spring; these pits are thought to be the primary source of contamination in the spring.

Waste Characteristics: Volatile organic compounds

Release Data: Prior to initiation of the remediation project in January 1994, spring water flowed into the storm drain system, which discharged into the K-1700 Stream (Mitchell Branch). Since initiation of the remedial action, the water is being collected for treatment and disposal.

Site Status: Long-term treatment of spring water is ongoing.

Media of Concern: None

Comments:

References:

Phase 2 Remedial Action Work Plan for the K-1070 Operable Unit SW31 Spring Project at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/01-1242 & D0, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, April 1994.

Phase II Remedial Design for the K-1070 Operable Unit SW31 Spring Project at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/03-1199/D1, Ebasco, Oak Ridge, Tennessee, November 1993.

Phase I Remedial Design for the K-1070 Operable Unit SW31 Spring Project at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/03-1139/V2 & D1, Ebasco, Oak Ridge, Tennessee, March 1993.

Remedial Design Work Plan for the K-1070 Operable Unit SW31 Spring Project at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/03-1118 & D1, Ebasco, Oak Ridge, Tennessee, February 1993.

Explanation of Significant Differences for the Interim Record of Decision for the Oak Ridge K-25 Site K-1070 Operable Unit SW31 Spring at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR/02-1132&D2, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, June 1993.

Interim Record of Decision for the Oak Ridge K-25 Site K-1070 Operable Unit SW31 Spring at the Oak Ridge K-25 Site, Oak Ridge, Tennessee, DOE/OR-1050, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, September 1992.

Date Prepared: June 1995

K/PH91-0763

SW31 Spring

K/PH93-7345

SW31 Spring

Unit Name: T-17 Light Equipment Garage

Unit Number: C085

Project Status:

Unit Location: K-25 Site centrifuge area, on the west side of Boulevard Road in the vicinity of where the K-1008-E, K-1008-F and K-1225 buildings now stand

Approximate Dimensions and Capacity: Approximately 200 × 50 ft

Dates Operated: 1943–1950s

Present Function: K-1008-E and K-1008-F are now located in the immediate vicinity of Building T-17, which has been demolished.

Life Cycle Operation: Ford, Bacon and Davis Building T-17 was built in 1943 as a light equipment repair garage for cars and trucks and as a five-pump gasoline station for a variety of equipment. The pumps were ordered removed in 1947, although no records have been found confirming that the removal was done. The T-17 building, which appears also to have been referred to as T-10 and K-1204, was redesignated as K-1209 in 1947. In 1951, Building K-1209 was listed as a spare parts warehouse. By July 1958 the building had been demolished.

Waste Characteristics: The following organic and lead contaminants are associated with gasoline, lubricating oils, antifreeze, and miscellaneous chemicals used in maintenance shops in the 1940s: tetraethyl lead, ethylene dibromide and dichloride, sulphur and sulphur derivatives, methyl and ethyl alcohol, xylene, toluene, benzene, alpha-methyl naphthalene, paratone, acrylic esters, phosphites, tin salts; calcium, barium and other metallic soaps; passive sulphur-chlorine, lead-active sulphur, naphthenic lube oil, kerosene, turpentine, ethyl alcohol and ethylene glycol.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Heating —Temporary Buildings Plot Plan, Ford, Bacon, and Davis Drawing No. F-3456-40, Clinton Engineer Works, September 25, 1943.

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

K-25 and K-27 Plot Plan, Rev. 3, Drawing No. AW-1M, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Clinton Engineer Works, Clinton, Tennessee, Area K-25, Location of Temporary Buildings, Drawing No. F-3456-1112, Ford, Bacon, and Davis Inc., June 14, 1944.

Date Prepared: January 1993

Date Revised: June 1995

T-17 Light Equipment Garage

Unit Name: T-21 Oil/Grease Station

Unit Number: C127

Project Status:

Unit Location: K-25 Site centrifuge area at the south end of present-day Building K-1008-F

Approximate Dimensions and Capacity: 60 × 20 ft

Dates Operated: 1943–46

Present Function: The building has been demolished.

Life Cycle Operation: Building T-21 was built by Ford, Bacon, and Davis Construction in 1943 as a temporary oil and lubricant storage building during construction of the K-1401 Conditioning Building. The building is numbered T-12 on 1946 maps. The building designation had been changed by August 1947 to the K-1214 Acid Storage Building. By July 1958 the building had been demolished.

Waste Characteristics: Unknown; however, wide range of greases and oils, solvents, antifreezes, etc., are thought to have been kept in T-21. Drum quantities of acids and of trichloroethylene are thought to have been stored in K-1412.

Release Data: No known releases

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments:

References:

Clinton Engineer Works, Clinton, Tennessee, Area K-25, Oak and Grease Storage Bldg. No. T- 21, Drawing No. F 3456-22, Ford, Bacon, and Davis Inc., September 15, 1943.

Heating —Temporary Buildings Plot Plan, Ford, Bacon, and Davis Drawing No. F-3456-40, Clinton Engineer Works, September 25, 1943.

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

K-25 and K-27 Plot Plan, Rev. 3, Drawing No. AW-1M, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Clinton Engineer Works, Clinton, Tennessee, Area K-25, Location of Temporary Buildings, Drawing No. F-3456-1112, Ford, Bacon, and Davis Inc., June 14, 1944.

Date Prepared: August 1994

Date Revised: June 1995

T-21 Oil/Grease Station

Unit Name: T-27/T-5 Pipe Welding Shop

Unit Number: C083

Project Status:

Unit Location: K-25 Site Main Plant Area, on the east side of Boulevard Road in the vicinity of the southern end of Building K-1220

Approximate Dimensions and Capacity: Approximately 250 × 90 ft

Dates Operated: 1940s

Present Function: The southern portion of Building K-1220, grass, and a parking lot cover the immediate vicinity of where the shop once stood.

Life Cycle Operation: Ford, Bacon and, Davis Construction, Inc., erected Building T-27 during construction of the Oak Ridge Gaseous Diffusion Plant in 1943 or 1944. Because another building to the north was also designated as T-27, records are ambiguous as to exactly what activities were carried out at this unit. Operations are thought to have included a welding shop and a cadmium spray booth for coating or metalizing uranium enrichment cascade traps and cylinders. Some time in 1945 the building was redesignated as T-5. In 1947 the building was dismantled and fabricated into two buildings, designated as K-1227 and K-1228 and used as voting booths. In 1951 buildings K-1227 and K-1228 were still designated as voting booths, but by July 1958 they had been demolished.

Waste Characteristics: Suspected contaminants are lead, silver, cadmium, low-level uranium contamination, and organic compounds from cutting oils.

Release Data: Reliable information is not available on the disposition of hazardous materials at the site.

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: Soil, groundwater

Comments:

References:

Heating—Temporary Buildings Plot Plan, Ford, Bacon, and Davis Drawing No. F-3456-40, Clinton Engineer Works, September 25, 1943.

Kellex Corporation Drawing No. FD-01-AA-2 R9, Marietta Energy Systems, Inc., Oak Ridge, Tennessee, January 16, 1995, March 31, 1946.

K-25 & K-27 Plot Plan, Drawing No. AW-1M, Rev. 3, Carbide and Carbon Chemicals Corporation, December 26, 1946.

Clinton Engineer Works, Clinton, Tennessee, Area K-25, Location of Temporary Buildings, Drawing No. F-3456-1112, Ford, Bacon, and Davis Inc., June 14, 1944.

Date Prepared: January 1993

Date Revised: June 1995

T-27/T-5 Pipe Welding Shop

Unit Name: 518 Main Substation

Unit Number: C128

Project Status:

Unit Location: K-25 Powerhouse Area, approximately 700 ft along a line extended from the southwest side of K-704, approximately 350 ft southeast of the eastern corner of the K-709 Switchyard

Approximate Dimensions and Capacity: 100 × 100 ft

Dates Operated: 1943–1944

Present Function: Inactive; two concrete piers from the original substation remain.

Life Cycle Operation: This unit was built to serve as a temporary substation for K-25 Site construction prior to building the K-709 Substation. By February 1944, the 518 unit had been removed and K-709 put in place.

Waste Characteristics: PCBs were used in electrical equipment during the operational period of this unit.

Release Data: No known releases

Site Status: This facility has been demolished and is no longer maintained as a discrete unit apart from general area surveillance and maintenance.

Media of Concern: None

Comments:

References:

General Layout, K-25 Area, Drawing No. 20024, J. A. Jones Construction Company, Est. 1944.

K-25 and K-27 Plot Plan and Status of Construction, Drawing No. FD-01-AA-2, The Kellex Corporation, February 27, 1944.

K-25 and K-27 Plot Plan, Rev. 3, Drawing No. AW-1M, Carbide and Carbon Chemicals Corporation, December 26, 1946.

J. A. Jones, *Plan and Profile No. 11, K-25 Power House Area*, Drawing No. 22338, July 17, 1944.

Date Prepared: August 1994

Date Revised: June 1995

518 Main Substation

518 Main Substation

Appendix A
K-25 SITE ENVIRONMENTAL RESTORATION
PROGRAM UNIT AREA BREAKDOWNS

Appendix A
K-25 SITE ENVIRONMENTAL RESTORATION
PROGRAM UNIT AREA BREAKDOWNS
(Individual Data Sheets Are in Bold)

DUCT ISLAND AREA

K-1070-F Construction Spoil Area

Duct Island Road

EAST OFF-SITE AREA

Poplar Creek Disposal Area

Blair Road Asphalt Plant

K-1099 Blair Road Quarry

K-25 AREA

K-1024 Sub-Area

K-1024 Building

K-1024-C

K-1024-B

K-1024-D

K-1024 Dilution Pit

K-300 UST

K-300-C Storage Facility

K-300-C-2

K-300-C-3

K-1064 Sub-Area

K-1064-G Drum Storage and Burn Area

K-1064-G Drum Deheading Facility

K-1600 Cleanup Area

K-1600 Technology Test Facility

K-101 Compressor Laboratory

Area Tielines

K-25/27 Tielines, Outdoor Process

K-25 Building

K-25 Process Building

K-25 Cylinder Storage Areas

K-1066-J Cylinder Storage Yard

K-1413 Sub-Area

K-1413 Process Lines/K-1413 Treatment Tank

K-1413 Building

K-25 Pumphouse and Water Treatment Facilities

K-801 Intake Water Pumphouse

K-801-A Water Treatment Facility

K-801-AA

K-801-BB

K-801-B Clariflow Tank

K-801-H Cooling Tower & Basin

K-802 Gasoline Storage Tank

Minimal Characterization Areas

K-25 Site North Trash Slope

J. A. Jones Cleaning Area

K-1025-E Warehouse

K-27 AREA

HF Storage Sheds Area Demolition

K-1132 HF Storage

K-1133

K-1134

K-1135

K-1131 Area Demolition

K-1131 Feed and Tails Building

K-1131 Neutralization Pile

K-1231 Sub-Area

K-1231 Process Building

K-1231-A

K-1231-B

K-413 Product Withdrawal Facility

K-1232 Sub-Area

K-1232 Chemical Recovery Facility/K-1232 CRF Lagoon

K-1233 Sub-Area
 K-1233 Collection Facility
 K-1233-A

K-1410 Sub-Area
 K-1410 Plating Facility
 K-1410 Neutralization Pit
 K-1031/1031-A Building

K-631/131 Area Demolition
 K-631 Contaminated Soil
 K-131 Maintenance
 K-631 Process Tails

K-27/29 Switchyards
 K-732 Switchyard/K-731 Switch house

K-29/29 Cylinder Storage Areas
 K-1066-E Storage Yard

K-633 Sub-Area
 K-633 Test Loop Facility
 K-633-D
 K-1040

K-27 Building
 K-29 Process Building

K-27 Tielines
 K-27 Tielines, Outdoor Process
 K-27/131
 K-27/413
 K-27/631
 K-27/633
 K-27/1131

K-29 RCW Lines
 K-27/29 Recirculating Cooling Water Lines

K-29 Cooling Towers and Associated Facilities
 K-832-H Cooling Tower
 K-832 Recirculating Water Pumphouse
 K-833 Cooling Water, Return Pump House

K-834 Valve House

K-29 Building

K-29 Process Building

Minimal Characterization Areas

Building 664 Heavy Equipment Shop

K-33 AREA

Cooling Tower Demolition Area

K-862 RCW Pumphouse

K-861 Cooling Tower and Basin

K-892 Fire Water and RCW Pumphouse

K-896-A

K-896-B

K-892-G Cooling Tower & Basin

K-892-H Cooling Tower & Basin

K-892-J Cooling Tower & Basin

K-891 Raw Water Pumphouse

K-31/33 Tielines

K-31 Tielines, Outdoor Process

K-31/631

K-31/33

K-31/33 RCW Lines

K-31 RCW Lines

K-33 RCW Lines

K-31/33 Switchyards

K-762 Switchyard/K-761 Switch House

K-792 Switchyard/K-792 Switch House

K-31 Building

K-31 Process Building

K-33 Building

K-33 Process Building

Minimal Characterization Areas

K-1206-E Sandblasting Residue

K-901 AREA

K-1070-A Old Contaminated Burial Ground

K-1070-A Landfarm

K-895 Cylinder Destruct Facility

K-901 South Disposal Area

K-901-A North Disposal Area

K-1066-K Cylinder Storage Yard

K-901 Holding Pond

NORTH MAIN PLANT AREA

K-822 Sub-Area

K-822 Cooling Tower Basin

K-1037 Recirculating Cooling Water Lines

K-1037 Sub-Area

K-1037 Building

K-1037 Barrier Plant (partial)

K-1037 Industrial Research Facility

K-1037-C Smelter House

K-1070-C/D Sub-Area

K-1070-C/D Classified Burial Ground

K-1070-D Pits

K-1071 Concrete Pad

K-1070-D1, D2, and D3 Storage Dikes

SW31 Spring

K-1414 Garage Diesel Tank

K-1300 Sub-Area

K-1300 Brick Stack

K-1301 Fluorine Production Facility

K-1302 Gas Cylinder Storage Area

K-1303 Fluorine Facility

K-1303 Mercury Distillation and Recovery Unit

Coal Yard Facilities

K-1501 Crusher Transfer Building

K-1503 Neutralization Pit

K-1401 RA/D&D

K-1401 Acid Line

K-1401 Degreasers

K-1401-N Converter Retubing Area

K-1401-NB Northwest Basement Area

K-1423 Grease Burial

K-1035 Sub-Area

K-1035 Acid Pits

K-1035 Gasoline Station

Minimal Characterization Areas

K-1098-C Asphalt Plant

K-1217 Metalizing Shop

K-1407 B/C Ponds Remedial Action

K-1407-B Holding Pond

K-1407-C Retention Basin

K-1407 Sub-Area

K-1066-B Cylinder Storage Yard

K-1070-B Old Classified Burial Ground

K-1070-G Burial Ground

K-1407 Contaminated Debris

K-1407-C Soil/K-1417 Soil

K-1700 Stream

K-1420 Sub-Area

K-1420 Contaminated Drum Storage

K-1420 Decontamination & Uranium Recovery

K-1420 Mercury Recovery Room

K-1420 Oil Decontamination Facility

K-1420 Oil Storage

K-1420 Process Lines

K-1420-B Flammable Liquid Storage

K-1420-C Gas Cylinder Storage

K-1420-D Valve Sprinkler House

K-1421 Incinerator

K-1422 Storage Building

Pond Waste Sub-Area

K-1417 Block Casting/Storage Area

K-1419 Sludge Fixation Plant

Minimal Characterization Areas

K-1218 Coded Chemicals Storage Facility

NORTH OFF-SITE AREA

K-25 Site Contractor's Spoil Area

POWERHOUSE AREA

Old Firehouse Minimal Characterization Sub-Area

K-1085 Old Firehouse Burn Area

Southern Railway Yard & Asphalt Plant

Round House Road

J.A. Jones Maintenance Complex

K-25 Demolition Materials Placement Area

Powerhouse Storage Buildings

K-724 Storage Building

K-726 PCB Storage Facility

K-736 Storage Warehouse

K-766 Storage Building

Thermal Diffusion Sites

F-05 Laboratory

F-07 Material Storage

F-08 Laboratory

Powerhouse Minimal Characterization Areas

K-710 Sludge Beds and Imhoff Tanks

K-722 Area Roads

Building F-29 Gasoline Station

Building 523 Grease Storage

Building 526 Heavy equipment Shop

518 Main Substation

Powerhouse Areas Recommended for Deletion with Letter

K-720 Fly Ash Pile

Scrap Metal Yard Sites

K-770 Scrap Metal Yard/K-770 Contaminated Debris

K-725 Building Demolition

K-725 Beryllium Building

Powerhouse Demolition Sub-Area

K-701 Boiler House & Fabrication Shop

K-702 Turbine Room & Discharge

K-703 Fabrication Shop, Bio Laboratory

K-705-B Crib House

K-706 Pump House

K-707 Auxiliary Switch House

K-709 Switchyard/K-709 Switchyard Towers

K-709-A

K-709-B

K-709-C

K-712 Fairchild Substation

K-715 Water Valve House

K-734 Storage Warehouse

K-735 Storage Building

K-735-A

K-738 Chlorinator House & Cylinder Storage

SOUTH MAIN PLANT AREA

K-1004-L Area RA/D&D

K-1004-J Underground Tank

K-1004-J Vaults

K-1004-L UF6 Pilot Plant

K-1010 Laboratory Receiving & Handling

K-1023 Laboratory

K-1004-Q Area Cleanup

K-797 Electrical Switch Gear Room

K-1004-J Laboratory, Special Development

K-1004-Q Centrifuge Laboratory

K-1004 Cooling Towers & RCW Lines

K-1004-L RCW Lines/K-1004-N Cooling Tower

K-1210 RCW Lines

K-1004-N1 Cooling Tower

K-1004-N2 Cooling Tower

Centrifuge Facilities RA/D&D

K-1023 Switch Gear Room

K-1045 Valve Shop

K-1052 Advanced Machine Development Lab

K-1200 Centrifuge, South Bay

K-1210 Centrifuge Test Facility

K-1210-A Advanced Engineering Test Facility

K-1220 CPDF-1&2

K-1007 Minimal Characterization Sub-Area

600 Series Oil Storage Area

665 Building

687/695 Oil Storage Operations

K-1007 Gas Tank

K-1007-P1 Holding Pond

K-1027 Service Station

K-1047 Motor Pool Repair Shop

K-1048 Tire & Battery Shop

K-1050 Wash, Grease, and Paint Shop

K-1055 Gasoline/Diesel Station

Building 569 Heavy Equipment Shop

J. A. Jones Disposal Area

K-1200 Minimal Characterization Sub-Area

K-1044 Heavy Equipment Repair Shop

K-1045-A Waste Oil Burn Pit

K-1236 Paint Shop

T-17 Light Equipment Garage

T-21 Oil/Grease Station

T-27/T-5 Pipe Welding Shop

Areas Recommended for Deletion by Letter

K-1004 Area Lab Drain

SOUTH OFF-SITE AREA

Flannagan's Loop Road

S-21 Happy Valley Service Station

LEGEND:

..... ROADS
 = = = UNPAVED ROADS
 CREEK & TRIBUTARIES
 [] BUILDING

LOCATION NO. UNIT NO. DESCRIPTION
 ①...C102. FLANNAGAN'S LOOP ROAD

Prepared For

LOCKHEED MARTIN
 By
 Science Applications
 International Corporation

FLANNAGAN'S LOOP ROAD
 SUB-AREA
 K-25 SITE

1 of 1 94024/DWGS/707RANGE 94024/PLOT/707RANGE
 DRAWING # CAD FILE # PLOT FILE #

LEGEND:

ROADS
UNPAVED ROADS
CREEK & TRIBUTARIES
BUILDING

LOCATION NO.	UNIT NO.	DESCRIPTION
①	C103	DUCT ISLAND ROAD
②	R018	K-1070-F CONST. SPOIL AREA

Prepared For
LOCKHEED MARTIN
By
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International Corporation

DUCT ISLAND AREA
K-25 SITE
OAK RIDGE, TENNESSEE

1 of 1
DRAWING # 94024/DWGS/7070DUCT CAD FILE # 94024/PLOT/7070DUCT PLOT FILE #

LEGEND:

..... ROADS
 UNPAVED ROADS
 CREEK & TRIBUTARIES
 BUILDING

LOCATION NO.
 UNIT NO.

DESCRIPTION

①...K-1251 BARGE UNLOADING FACILITY

Prepared For
LOCKHEED MARTIN
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CLINCH RIVER
 SUB-AREA

K-25 SITE
 OAK RIDGE, TENNESSEE

94024/DWGS/707BC

REV. 1 - 05/18/95

CAD FILE

REV. - DATE

K-1064 SUB-AREA

LOCATOR NO.	UNIT NO.	DESCRIPTION
①	R020	K-1064-G DRUM DEHEADING FACILITY
②	R007	K-1064-G DRUM STORAGE AND BURN AREA

BLAIR ROAD SUB-AREA

LOCATOR NO.	UNIT NO.	DESCRIPTION
③	R019	K-1099 BLAIR QUARRY
④	C113	BLAIR ROAD ASPHALT PLANT
⑤	C105	CONTRACTORS SPOIL AREA
⑥	C110	POPLAR CREEK DISPOSAL AREA

K-25 PUMPHOUSE AND WATER TREATMENT FACILITIES

LOCATOR NO.	UNIT NO.	DESCRIPTION
⑦	K-801	INTAKE, WATER PUMP HOUSE
⑧	K-801-A	WATER TREATMENT FACILITY
⑨	K-801-B	CLARIFLOW TANK
⑩	K-801-H	COOLING TOWER
⑪	C003e	K-801-H COOLING TOWER BASIN
⑫	C003g	K-802-H COOLING TOWER BASIN
⑬	C091	K-802 GASOLINE STORAGE TANK
⑭	R174	K-802 PUMPHOUSE
⑮	K-801-AA	VALVE VAULT
⑯	K-801-BB	VALVE VAULT

MINIMAL CHARACTERIZATION AREA

⑰	C106	K-25 SITE NORTH TRASH SLOPE
---	------	-----------------------------

NORTH AREAS

K-25 SITE OAK RIDGE, TENNESSEE

Prepared For
LOCKHEED MARTIN
By
**Science Applications
International Corporation**

LEGEND:

.....	ROADS 5.39±
-----	UNPAVED ROADS
..	CREEK & TRIBUTARIES
□	BUILDING

0 200 400 800
SCALE: 1" = 400'

SAIC CAD FILE:
94024/DWGS/707K1064.DWG

REV. 2 - 06/12/95

K-25 Plant North
True North

LEGEND:

REMEDIAL ACTION, DECONTAMINATION AND DECOMMISSIONING FACILITY INVENTORY

K-25 SITE
OAK RIDGE, TENNESSEE

Prepared For
LOCKHEED MARTIN
By
Science Applications
International Corporation

SCALE: 1" = 2000'

REVISION	EXAM BY:	CHKD. BY:	DATE:
0	HOLM	M. STANLEY	11/15/94
1	HOLM	M. STANLEY	06/26/95

XREFERENCES	PLOT FILES
94024/XREF SIMULS	

94024/3WGS/707LOC
CNO FILE #

N/A
ROT. ANGLE

K-1007 MINIMAL CHARACTERIZATION SUB-AREA

LOCATOR NO.	UNIT NO.	DESCRIPTION
1	U007	K-1007 GAS TANK
2	R044	K-1007-P1 HOLDING POND
3	C079	K-1048 TIRE & BATTERY SHOP
4	C080	K-1050 WASH, GARAGE & PAINT SHOP
5	C081	K-1047 MOTOR POOL
6	C086	REPAIR SHOP
7	C089	K-1027 SERVICE STATION
8	C078	K-1055 GASOLINE/DIESEL STATION
9	C107	BLDG. 569 HVY. EQUIPMENT SHOP
10	C121	J.A. JONES DISPOSAL AREA
11	C125	BLDG. 665 STEM SHED
12	C126	600 SERIES OIL STORAGE
		695/687 OIL STORAGE
		OPERATIONS

K-1007 MINIMAL CHARACTERIZATION SUB-AREA RECOMMENDED FOR DELETION BY LETTER

13	R017	K-1004 AREA LAB DRAIN
----	------	-----------------------

K-300 UST SUB-AREA

14	C093	K-300 UST
----	------	-----------

K-1007 AND SURROUNDING AREAS

K-25 SITE OAK RIDGE, TENNESSEE

Prepared For
LOCKHEED MARTIN

By
**Science Applications
International Corporation**

LEGEND:

—————	ROADS 5.39±
-----	UNPAVED ROADS
~~~~~	CREEK & TRIBUTARIES
▬	BUILDING
▨	FORMER LOCATION

0 100 200 300 600

SCALE: 1" = 300'

K-1401 RA/D & D		
LOCATOR NO.	UNIT NO.	DESCRIPTION
①	R013	K-1401 ACID LINE
②		K-1401-N CONVERTER RE-TUBING AREA
③	C005	K-1401 DEGREASERS
④		K-1401 N NORTHWEST BASEMENT AREA
⑤	C123	K-1423 GREASE BURIAL

MINIMAL CHARACTERIZATION AREAS

⑥	R133	K-1021 OLD FIRE HALL
⑦	C115	K-1098-C ASPHALT PLANT
⑧	C116	K-1217 METALLIZING SHOP
⑨	C094	K-1401 DOOR 2W GASOLINE TANK
⑩	C109	K-1239 CONTAMINATED MATERIALS DISPOSAL PIT

K-1035 SUB-AREA

⑪	R083	K-1035 ACID PITS
⑫	C092	K-1035 GASOLINE STATION

COAL YARD FACILITIES

⑬		K-1501 E COAL CONVEYOR
⑭	R047	K-1503 NEUTRALIZATION PIT

K-1070 C/D SUB-AREA		
LOCATOR NO.	UNIT NO.	DESCRIPTION
⑮		K-1070 PITS
⑯		K-1070 CONCRETE PAD
⑰	R005	K-1070-C/D CLASSIFIED BURIAL GROUND
⑱	R026	K-1070-D1, D2, & D3 STORAGE DIKES
⑲	U008	K-1414 GARAGE DIESEL TANK
⑳	C098	SW31 SPRING

K-1037 SUB-AREA

⑳	R135	K-1037 BARRIER PLANT (PARTIAL)
㉑		K-1037 INDUSTRIAL RESEARCH FACILITY
㉒		K-1037 C SMELTER HOUSE

K-822 SUB-AREA

㉓	C003a	K-822 COOLING TOWER BASIN
㉔	C003b	K-1037 RCW LINES

Prepared For
LOCKHEED MARTIN
By
**Science Applications
International Corporation**

**K-1070 C/D AND
SURROUNDING SUB-AREAS**

**K-25 SITE
OAK RIDGE, TENNESSEE**

LEGEND:

=====	ROADS
-----	UNPAVED ROADS
~~~~~	CREEK & TRIBUTARIES
□	BUILDING

K-1004-L AREA RA/D & D

LOCATOR NO.	UNIT NO.	DESCRIPTION
1	C046	K-1004-J VAULTS
2		K-1004-L UF6 PILOT PLANT
3	R074	K-1004-L UNDERGROUND TANK
4		K-1010 LABORATORY, RECEIVING AND HANDLING
5		K-1023 LABORATORY

K-1004-Q AREA CLEANUP

6		K-797 ELECTRICAL SWITCH GEAR ROOM
7		K-1004-J CENTRIFUGE, LAB-SPECIAL DEVELOPMENT
8		K-1004-Q CENTRIFUGE LABORATORY

K-1004 RCW LINES

9	C003c	K-1004-L RCW LINES
10		K-1004-N COOLING TOWER
11		K-1004-N1 COOLING TOWER
12		K-1004-N2 COOLING TOWER
13	C003f	K-1210 RCW LINES

CENTRIFUGE FACILITIES RA/D & D

14		K-798 K-1023, ELECTRICAL SWITCH GEAR ROOM
15		K-1045 VALVE SHOP
16		K-1052 ADVANCED MACHINE DEVELOP LAB
17		K-1200 CENTRIFUGE, SOUTH BAY
18		K-1210 CENTRIFUGE TEST FACILITY
19		K-1210-A ADVANCED ENGINEERING TEST FACILITY
20		K-1220 CPDF-1
21		K-1220 CPDF-2

K-1200 MINIMAL CHARACTERIZATION SUB-AREA

LOCATOR NO.	UNIT NO.	DESCRIPTION
22	C082	K-1044 HEAVY EQUIPMENT REPAIR SHOP
23	C129	K-1045-A WASTE OIL BURNING PIT
24	C084	K-1236 PAINT SHOP
25	C085	T-17 LIGHT EQUIPMENT GARAGE
26	C127	T-21 OIL/GREASE STATION
27	C083	T-27/T-5 PIPE WELDING SHOP

Prepared For
LOCKHEED MARTIN
By
**Science Applications
International Corporation**

**CENTRIFUGE AND
SURROUNDING AREAS**

**K-25 SITE
OAK RIDGE, TENNESSEE**

LEGEND:

=====	ROADS
=====	UNPAVED ROADS
~~~~~	CREEK & TRIBUTARIES
□	BUILDING

K-25 SITE
OAK RIDGE, TENNESSEE

POWERHOUSE DEMOLITION SUB-AREA

LOCATOR NO.	UNIT NO.	DESCRIPTION
1		K-701 BOILER HOUSE & FABRICATION SHOP
2		K-702 TURBINE ROOM & DISCHARGE
3		K-703 FAB SHOP, BIO LABORATORY
4		K-705-B CRIB HOUSE
5		K-706 PUMP HOUSE
6		K-707 AUXILIARY SWITCH HOUSE
7	R075a	K-709 SWITCHYARD & TOWERS
8		K-709-A OIL VALVE HOUSE
9		K-709-B TANK
10		K-709-C FIRE SYSTEM VALVE HOUSE
11		K-712 FAIRCHILD SUBSTATION
12		K-734 STORAGE WAREHOUSE
13		K-735 STORAGE BUILDING
14		K-738 CHLORINATOR HOUSE & CYLINDER STORAGE

POWERHOUSE STORAGE BUILDINGS

15		K-724 STORAGE BUILDING
16	R040	K-726 PCB STORAGE FAC.
17		K-736 STORAGE WAREHOUSE
18		K-766 STORAGE BUILDING

K-725 BUILDING DEMOLITION

19	C004	K-725 BERYLLIUM BUILDING
----	------	--------------------------

SCRAP METAL YARD SITES

20	C009	K-770 CONTAMINATED DEBRIS
21	R008	K-770 SCRAP METAL YARD

THERMAL DIFFUSION SITES

LOCATOR NO.	UNIT NO.	DESCRIPTION
22	C119	F-05 LABORATORY
23	C117	F-07 MATERIAL WAREHOUSE
24	C122	F-08 LABORATORY

POWERHOUSE MINIMAL CHARACTERIZATION AREAS

25	R076	K-710 SLUDGE BEDS AND IMHOFF TANKS
26	C088	BUILDING F-29 GASOLINE STATION (FL)
27	C077	BUILDING 526 HEAVY EQUIPMENT SHOP
28	C111	K-722 AREA LANDFARMING
29	C128	518 MAIN SUBSTATION
30	C124	BUILDING 523 GREASE STORAGE

POWERHOUSE AREA RECOMMENDED FOR DELETION BY LETTER

31	R045	K-720 FLY ASH PILE
----	------	--------------------

Prepared For
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By
**Science Applications
International Corporation**

POWERHOUSE AREA

**K-25 SITE
OAK RIDGE, TENNESSEE**

LEGEND:

.....	ROADS
-----	UNPAVED ROADS
~~~~~	CREEK & TRIBUTARIES
□	BUILDING
▨	FORMER LOCATION

N -22,200

E -6,200

K-1070-A
BURIAL GROUND
K-901 AREA

2

K-901-A-SDA 6

WEST PERIMETER ROAD

K-892 AREA

K-33 AREA

K-31 AREA

AVENUE NORTH

K-901 AREA

LOCATOR NO.	UNIT NO.	DESCRIPTION
1		K-1066-K CYLINDER STORAGE YARD, WEST K-33
2	C104	K-1070-A LANDFARM
3	R001	K-1070-A OLD CONTAMINATED BURIAL GROUND
4	R077	K-901 SOUTH DISPOSAL AREA
5	R006	K-901-A HOLDING POND
6	R081	K-901-A NORTH DISPOSAL AREA
7	C087	K-895 CYLINDER DESTRUCT FACILITY

K-31/33 TIELINES

8	R184	K-31/K-631 TIELINES, OUTDOOR PROCESS
9	R184	K-33/K-31 TIELINES, OUTDOOR PROCESS

K-31/33 RCW LINES

10	C003j	K-31 RCW LINES
11	C003k	K-33 RCW LINES
12		K-891 RAW WATER PUMPHOUSE

K-31/33 SWITCHYARDS

13	R075d	K-762 SWITCHYARD
14	R172	K-761 SWITCH HOUSE
15	R075b	K-792 SWITCHYARD
16	R173	K-792 SWITCH HOUSE

K-31 BUILDING

17	R160	K-602-1, -2, -3, -4, -5, & -6
----	------	-------------------------------

K-33 BUILDING

18	R162	K-902-1, -2, -3, -4, -5, -6, -7, & -8
----	------	---------------------------------------

MINIMAL CHARACTERIZATION AREA

LOCATOR NO.	UNIT NO.	DESCRIPTION
19	C076	K-1206-E SANDBLASTING RESIDUE

COOLING TOWER PROJECT AREA

20	C003k-861	COOLING TOWER & BASIN
21	R176	K-862 K-31 RECIRCULATING WATER PUMP HOUSE
22		K-892 PUMP HOUSE AREA
23	C003m	K-892-G COOLING TOWER & BASIN
24	C003n	K-892-H COOLING TOWER & BASIN
25	C003o	K-892-J COOLING TOWER & BASIN

Prepared For
LOCKHEED MARTIN
 By
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K-33 AND
 SURROUNDING AREAS

K-25 SITE
 OAK RIDGE, TENNESSEE

LEGEND:

=====	ROADS
-----	UNPAVED ROADS
~~~~~	CREEK & TRIBUTARIES
□	BUILDING
----	TIELINES

Appendix B
ER REMOTE SENSING AND
SPECIAL SURVEYS PROGRAM

Appendix B

ER REMOTE SENSING AND SPECIAL SURVEYS PROGRAM

A. L. King, J. L. Smyre, W. E. Doll

INTRODUCTION

This section is included in this document to provide an overview of other types of information that are available for evaluation of specific sites and areas of the K-25 Plant described in the main text of this document. This information was obtained through the efforts of the Environmental Restoration (ER) Remote Sensing and Special Surveys Program which was established to apply state-of-the-art remote sensing and geophysical technologies to projects managed by the Environmental Restoration and Waste Management Programs, and to manage routine and remotely-sensed examinations of the Oak Ridge Reservation (ORR), the Paducah Gaseous Diffusion Plant (PGDP), the Portsmouth Gaseous Diffusion Plant (PORTS), and adjacent off-site areas.

Activities included in the Remote Sensing and Special Surveys Program (RSSSP) include low altitude radiological surveys, multispectral scanning, and photographic surveys (natural color and color infrared) conducted at several altitudes; repeated multispectral scanner (MSS) imagery, gamma, and photographic surveys; and airborne geophysical surveys.

The data acquired from the RSSSP surveys includes geophysical data such as magnetic, electrical resistivity and radiological changes and anomalies; and topographic data and features such as seeps, springs, saturated areas, water bodies, and stressed areas of vegetation. Advanced methods used in collecting geophysical data extend the readings several meters into the soil (100 m or more), allowing identification of subsurface features such as geologic formations and structures, and subsurface disposal units.

The uses of the data acquired by the RSSSP are unlimited. Proven uses of these sorts of data include locating potential contamination sources; characterizing sites; establishing baselines for comparison with future conditions; providing a data base of information for detailed analysis, comparisons, and integration with field measurements and map data; assisting in remedial investigation planning; aiding in long-term monitoring of environmental improvements from restoration activities; detecting temporal changes associated with contaminant transport or remediation efforts; improving geographic database (e.g., facility layout, land cover, topography); documenting changes in land use and waste site activity, as well as associated impacts of these changes on vegetation and water resources; monitoring degradation that might occur in waste containment vessels; monitoring improvements from restoration efforts and cleanup at a later stage in the remediation life cycle; identifying possible contaminant transport pathways; identifying unknown waste sites; and detecting features resulting from former land use practices.

REMOTE SENSING METHODS

This section includes a brief description of several remote sensing methods and outlines the basic features and the utility of the surveys. Examples of each of the methods is provided using data collected from the K-25 Site area.

High Resolution Gamma Radiation Survey

Gamma radiation surveys includes both natural and man-made sources of gamma radiation. Natural sources of gross count gamma radiation includes natural background radiation from terrestrial sources (radionuclides present in small amounts in the earth's soil and bedrock), from radon gas, and from cosmic rays from outer

space. Man-made gamma radionuclide data, such as that illustrated in Figure 1, include only the portion of gross count that can be directly attributed to gamma rays from man-made sources. Interpretation of the gamma energy spectra can make possible the determination of specific radioisotopes that contribute to the observed man-made gamma radiation, either as direct or as indirect (i.e., daughter) gamma energy from specific radionuclides (e.g., cesium-137, cobalt-60, uranium-238). These surveys are useful throughout the DOE-ORO complex because many of the radioactive materials processed or handled on the ORR, PGDP, and PORTS are direct gamma radiation emitters or have gamma emitting daughter radionuclides.

Gamma radiological surveys of the ORR have been conducted at 150 feet (46 m) altitude. Those areas near power lines and other obstructions are flown at higher altitudes. High resolution airborne gamma radiation surveys require a helicopter outfitted with one or two detector pods, a computer-based data acquisition system, and an accurate navigational positioning system for relating collected data to ground location. Greater gamma sensitivity can be obtained when soils have a low water content; therefore surveys result in higher quality data if they are conducted during the late summer and early autumn, or from August through October. Sensors measure the ground-level gamma energy spectrum in the 38 to 3,026 KeV range. Analysis of sensor data can provide gamma emission strength in counts per second for either gross or total man-made gamma emissions.

Natural Color Photography

Natural color aerial photographs are beneficial in environmental investigations because they allow an investigator to obtain a visual perspective of the site geographic and cultural features that may complement other environmental measurements. For example, aerial gamma radiation data can be overlain on a natural color photo to provide increased accuracy in data interpretation as well as identification of surface features that may relate to the radiation (see Figure 1). Aerial photos provide current information on surface features and characteristics needed for updating earlier maps and data bases, including the derivation of detailed digital terrain elevations (see Figures 2 and 3). Aerial photography can also be used to capture current land use and waste disposal practices. In recent years, natural color aerial photographs have been used to supplement written records of construction and waste disposal practices.

Although most aerial photography has been flown prior to spring vegetative leafout because ground and terrain details are more easily visible, aerial photography that spans a variety of seasonal, vegetative, and rainfall conditions proves valuable. High resolution natural color photos of the ORR have been taken from flight altitudes of 2000 feet, 6000 feet, and 9500 feet above ground level (AGL), and these can be georectified and scaled to provide a base for overlay of map data such as contours derived from other aerial surveys (e.g., gamma radiation, surface temperature). At 43,000 feet AGL, the entire ORR can be shown on one photograph.

False Color Infrared Photography

Color infrared (IR) photography is sometimes termed "false color infrared photography" because the wavelengths to which the color infrared film is sensitive do not match those of the visual spectrum to which the human eye is sensitive. False color infrared photography blocks out visible light reflectance in the green waveband region of the visible spectrum and intensifies the near infrared bands.

False color IR provides a valuable means for locating vegetation anomalies and water-saturated areas. For example, stands of evergreens and pine plantations can be easily distinguished from deciduous forests because the conifers appear as deep red on color IR photography (refer to Figure 4). Similarly, the vigor of growth of grassland and pasture in springtime can be monitored by inspecting the degree of pinkish or reddish tone in the false color photography. Variation in color IR reflectances from water bodies such as settling ponds and lakes (producing shades of blue from light to very dark) can assist determination of water conditions such as turbidity, sedimentation, depth, and algal growth.

At the ORR, color infrared photographs are usually obtained during the daytime flights used for multispectral scanner imagery (MSS). The color infrared photography acquired as part of the ER Remote Sensing Program was obtained at 3000 and 6000 feet AGL. As with natural color photography, high resolution color infrared photos from these flight altitudes can also be georectified and scaled to provide a base for overlay of spatial data, or the color IR photography can be analyzed directly for its information content.

Multispectral Scanner Imagery

The MSS spectrometer digitally records the solar reflectance and emissions of electromagnetic (EM) radiation from the earth's surface and partitions the results into 12 distinct wavebands ranging from ultraviolet to thermal infrared, including two thermal channels of the same wavelength but different sensor gain settings. (Figure 5 illustrates 3 of the 12 bands from 1994 MSS imagery of the K-25 Plant.) The multispectral scanner (MSS) imagery technique uses a commercial (e.g., Daedalus) or custom-built scanning spectrometer flown in a small jet aircraft (e.g., Cessna Citation). Aerial measurements can be obtained during the daytime and at predawn to enhance detection of diurnal temperature changes through comparison of the two different thermal patterns. Representative altitudes (AGL) flown for MSS imagery collected at the ORR are 2000 feet, 3000 feet, and 6000 feet during the day and 2000 feet and 4000 feet during the predawn period.

Daytime Multispectral Imagery

The daytime MSS can be analyzed to produce land cover/land use databases (see an example in Figure 6). Another use of MSS imagery in environmental studies is detection of unnatural vegetative stress induced by soil and/or groundwater contamination of the root zone. Vegetation under stress exhibits different light absorption and reflectance properties (hence different MSS images) from the same species in non-stressed conditions. After geographic rectification, comparisons can be made with similar data from previous time periods to detect temporal changes and identify surface anomalies.

Predawn Thermal IR Imagery

Another use of MSS, particularly predawn thermal, is the study of surface and near-surface thermal features. Among applications in the environmental area are (1) the use of temperature variations in water bodies as indicators of internal mixing and of external inputs such as tributaries, springs, and heated effluent; (2) delineation of stream courses and identification of seeps and springs from surface temperature differences; (3) study of the relation of seeps and springs to seasonal changes and precipitation events (when multi-date imagery is available); and (4) determination of thermal properties of materials from comparison of daytime and predawn imagery (Figures 7 and 8 present a comparison of daytime MSS and predawn thermal imagery of K-25). If thermal data are acquired periodically, changes in the groundwater behavior of water seeps or in corroding physical plant structures (e.g., building rooftops or underground pipes) may be determined.

Magnetic Detection Methods

Surface and airborne measurements of perturbations in the direction and/or strength of the earth's magnetic field are used to locate magnetized objects or structures in the subsurface. These methods have typically been used to locate or characterize geologic features but are also effective at locating manmade objects composed of materials that can become magnetized. Although both total field and directional (e.g., vertical component) magnetometers can be deployed in fixed wing aircraft, such deployment is unable to achieve a low enough altitude and slow enough air speed to give sufficient resolution required for the purposes of this program. For helicopter surveys, the greatest sensitivity and shortest repeat interval are achieved with instruments employing "optically pumped" sensors, such as cesium or rubidium magnetometers. These instruments are often deployed in pairs and arranged with one lying directly above the other at a fixed spacing to measure vertical magnetic gradients. Such an instrument is referred to as a magnetic gradiometer.

Surface (total field) magnetic measurements are typically made with proton precession magnetometers. Altitude and flight path spacing, along with natural and instrument noise levels, determine the minimum size of the target that can be detected using airborne methods. Depths of several kilometers may be detected with aeromagnetic instruments. The capability of detecting a single 55-gallon drum from the air has been reported, but groups of drums are more likely a minimum target size. Surface magnetic measurements can be used in follow-up surveys to detect much smaller objects.

Figure 9 illustrates the pole-reduced residual magnetic field over the K-25 area, collected during the 1993 airborne geophysical reconnaissance of the ORR. No data were taken over the K-25 plant area itself, shown in darkest blue. However, the edge of the plant area, power lines running into the plant from the northwest, and some waste disposal areas appear as large magnetic anomalies on the plot (deep blues, greens, reds).

Electromagnetic Methods

Electromagnetic detection schemes are based on the amplitude and phase of a time-varying EM field induced in the earth. Many of these methods have been adapted to aerial surveillance from the mineral survey industry. Modern airborne EM systems use multifrequency sensors with each of the three or five frequencies being generated and received by a pair (one transmitter and one receiver) of vertical coaxial or horizontal coplanar coils. The coil orientation (vertical coaxial or horizontal coplanar), frequency, and resistivities of the target and the host determine the shape and penetration depth of anomalies to which the coil pair is sensitive. Penetration depths of a few feet for the high frequencies (> 36 kHz) and a few hundred feet for the lower frequencies (< 800 Hz) are typical.

Airborne EM data may be collected during the same flight as aeromagnetic data because they are sensitive to change in resistivity rather than magnetic properties. EM instruments can detect objects to which magnetic surveying is insensitive, such as cement or stainless steel structures. For typical metallic objects, airborne EM methods are less sensitive than aeromagnetic measurements. Electromagnetic instruments are generally better suited for the detection of geologic and hydrogeologic structures. Surface EM measurements can improve the resolution of shallow targets. These data are useful for determining changes in the resistivity of the medium and provide an effective way to check suspicious areas that are identified during an airborne survey.

Figure 10 illustrates the use of resistivity measurements from the 1993 airborne geophysical survey to provide information about geologic contacts in the K-25 area. No data were collected directly over the K-25 Plant, shown in purple. The resistive Knox group dolomites appear in green at the top of the figure. The K-25 Plant is on the less resistive Chickamauga group, shown by the yellows. South of K-25, the shales of the conductive Rome Formation appear as shades of red. Power lines and roads also appear as narrow conductive (red) strips in the coaxial area. Some of the larger waste storage areas also appear as conductors.

SUMMARY OF THE REMOTE SENSING PROGRAM

Remote sensing surveillance is probably one of the most cost-effective and time-efficient means for monitoring large areas of landscape for hazardous waste sites and waste site impacts. High resolution photographic, multispectral, and radiological data, as well as geophysical data, can be gathered for the ORR, PGDP, and PORTS in a timely, cost-effective manner that would be impossible by spot ground surveys. These data can be used to improve the boundary resolution of known waste sites and to detect any waste sites that might be previously unknown. They can also be used to monitor remediation efforts and subsurface contaminant transport in later phases of the clean-up process.

Staff throughout Energy Systems and many subcontractors create, process, and analyze environmental data as part of their daily activities. This data includes requests for maps, imagery, and results of photographic image analyses of remotely sensed data. The RSSSP serves as a focal point for remote sensing technology, data, and analysis and provides a data resources needed by activities on the ORR, PORTS, and PGDP.

The use of advanced technologies described in this appendix are critical to conducting a successful ER Program for these DOE facilities. Developing and applying these remote sensing technologies can reduce restoration costs by improving efficiency in all phases of the effort and can direct attention to the most serious problems and result in saving millions of dollars. The ability to collect, manage, and analyze these vast amounts of information is vital to identifying and characterizing the problems, modeling and assessing their impacts, prioritizing and designing effective cleanup solutions, meeting regulatory requirements, and long-term monitoring to verify compliance.

Assistance from the Remote Sensing and Special Surveys Program may be obtained by contacting one of the following: (1) A. L. King (CPED, 576-1509, email: kingal@ornl.gov), (2) J. L. Smyre (CPED, 574-2968, email: smyrejl@ornl.gov), or (3) W. E. Doll (ESD, 576-9930, email: dollwe@ornl.gov).

1000

0

1000

Figure 1. Man-made gamma radiation contour lines overlaid on a mosaic elevation.

**Manmade Gamma Radiation
Contours at K-25 Plant
(April, 1992)**

Overlaid on

**Rectified Natural Color Mosaic
(6000 Foot Altitude Photography,
March 23, 1994, frames 78, 80)**

**Data acquired by
EG&G/EM, Las Vegas, NV**

for the ER Remote Sensing Program

**Processing by
GIS and Computer Modeling Group
Computational Physics & Engineering Div.
Oak Ridge National Laboratory**

2000 3000 Meters

**rs at K-25 Plant. These data from a 1992 airborne
natural color photography acquired in 1994 at 6000 feet**

Produced by GIS & Computer Modeling,
Computational Physics and Engineering Division, ORNL

Figure 2. 1942 elevation map of K-25 Plant. These data are derived from a 1942 map of the plant area before the facility was built. 1992 elevation contours are overlaid on the 1942 map.

735	920	1125
736	925	1130
737	950	1135
738	975	1140
739	1000	1145
740	1005	1150
745	1010	
750	1015	
755	1020	
760	1025	
765	1030	
770	1035	
775	1040	
780	1045	
785	1050	
790	1055	
795	1060	
800	1065	
825	1070	
850	1075	
875	1080	
880	1085	
885	1090	
890	1095	
895	1100	
900	1105	
905	1110	
910	1115	
915	1120	

1992 10-Foot Contours

1942 Elevations

With 1992 Contours

from 1942 aerial photography of the
also shown for comparison.

Figure 3. Elevation cut and fill map of K-25 Plant. This image shows the changes in elevation, such as leveling areas for construction. The main buildings of the plant are overlaid to

Fill
Cut
Elevation Contours
1992 Building Outlines

Cut and Fill

20 Foot Contours and Building Outlines

Produced by GIS & Computer Modeling,
Computational Physics and
Engineering Division, ORNL

ation between 1942 and 1992 as the result of human activity,
w their correspondence with areas of cut and fill.

1000

0

1000

2

Figure 4. Color infrared photographic mosaic of K-25 Plant. The photograph was acquired at 60 conifers. Pinkish areas are associated with the springtime growth of grass.

**Rectified Color Infrared
Mosaic of K-25 Plant**

**6000 Foot Altitude Photography
April 13, 1992 (frames 6, 8, 51, 53)**

**Data acquired by EG&G/EM, Las Vegas, NV
for the ER Remote Sensing Program**

**Processing by
GIS and Computer Modeling Group
Computational Physics and Engineering Division
Oak Ridge National Laboratory**

False Color Imagery

0 Meters

et altitude in April, 1992. Note correlation of dark red portions of the imagery with

500

0

500

10

Figure 5. Daytime multispectral imagery mosaic of no derived from 1994 2000-foot data and depicts MSS band components. These bands correspond to, respectively, portions of the electromagnetic spectrum.

Rectified Daytime Multispectral Scanner (MSS) Mosaic of Northwest K-25 Plant

2000 Foot Altitude Daedalus AADS-1268
Imagery, March 22, 1994 (flight paths 11, 13)

Data acquired by EG&G/EM, Las Vegas, NV
for the ER Remote Sensing Program

Processing by
GIS and Computer Modeling Group
Computational Physics and Engineering Division
Oak Ridge National Laboratory

***False Color Imagery
Bands 3, 6, 9 (R, G, B)***

Meters

West K-25 Plant. This is a false color image
3, 6, and 9 as the red, green, and blue color
n/yellow, near infrared, and middle infrared

Figure 6. Landcover classification of a portion of 1
a combination of supervised (under human analysis)
classification techniques performed on daytime M.

Preliminary Landcover Classification of Northwest K-25 Plant

from 2000 Foot Altitude
Multispectral Scanner (MSS) Imagery,
March 22, 1994 (flight path 11)

Landcover Classes

■ Water	□ Grass	□ Deciduous
■ Developed	□ Scrub/Mixed	□ Shadow-Obscured
□ Bare Ground	□ Conifers	■ Unclassified

Data acquired by
EG&G/EM, Las Vegas, NV
for the ER Remote Sensing Program

Processing by
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Approximate North

Northwest K-25 Plant. This classification was derived by
supervised (manual) and unsupervised (automated software) image
classification of MSS imagery acquired at 2000 feet in March, 1994.

500 0 500 1000

Figure 7. Daytime thermal imagery of K-25 Plant. The 25 to a blue-to-red color ramp in which deep blues are cooler and reds are warmer. Observe that rooftops and asphalt surface bodies such as Poplar Creek are relatively cool.

Rectified Daytime Thermal IR Mosaic of Northwest K-25 Plant

2000 Foot Altitude MSS Band 11 Imagery,
March 22, 1994 (flight paths 11 and 13)

Data acquired by EG&G/EM, Las Vegas, NV
for the ER Remote Sensing Program

Processing by
GIS and Computer Modeling Group
Computational Physics and Engineering Division
Oak Ridge National Laboratory

***Sensor brightness values coded
from cooler temperatures (blue)
to warmer temperatures (red)***

1500 Meters

Brightness values in the data have been coded
Temperatures are intermediate in temperature, and
have absorbed heat from the sun, while water

1000

0

Figure 8. Predawn thermal imagery of K-25 Plant. The 2 to a blue-to-red color ramp in which deep blues are cooler, reds are warmer. Note that rooftop surfaces and sparsely during the daytime, while water bodies such as Poplar Creek are warm.

Rectified Predawn Thermal IR Mosaic of Northwest K-25 Plant

2000 Foot Altitude Band 11 Imagery,
March 19, 1994 (flight paths 51, 53)

Data acquired by EG&G/EM, Las Vegas, NV
for the ER Remote Sensing Program

Processing by
GIS and Computer Modeling Group
Computational Physics and Engineering Division
Oak Ridge National Laboratory

***Sensor brightness values coded
from cooler temperatures (blue)
to warmer temperatures (red)***

1000 Meters

rightness values in the data have been coded
eens are intermediate in temperature, and
red ground surfaces have lost heat acquired
have retained their heat and are relatively

POLE-REDUCED RESIDUAL MAGNETICS

Figure 9. Pole-reduced residual magnetic field over K-25 Plant area. The nominal sensor height was about 50 meters. Data have been processed such that the anomalies appear as if the earth's magnetic field were oriented vertically. Data are in Administrative Grid coordinates, with horizontal and vertical scales in feet. The scale to the right is in nanoteslas (nT).

LOG APPARENT RESISTIVITY (COAXIAL)

Figure 10. Coaxial apparent resistivity of the K-25 area. The data were collected at a nominal sensor height of 30 meters and at a frequency of 4600 Hz using a coaxial loop orientation. Data are in Administrative Grid coordinates, with horizontal and vertical scales in feet. The scale to the right is in $\log_{10}$ (ohm-meters).

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